ENGINEERING
LIBRARY

April 4, 1949

STEEL

APR 6 1949

The Magazine of Metalworking and Metalproducing

CONTENTS — PAGE 53

Bailey

MECHANICAL
GOGGLE
VALVES

60" x 48"
BAILEY VALVE
FOR HORIZONTAL
GAS MAINS
other sizes—
6" to 72"

Rugged and Dependable

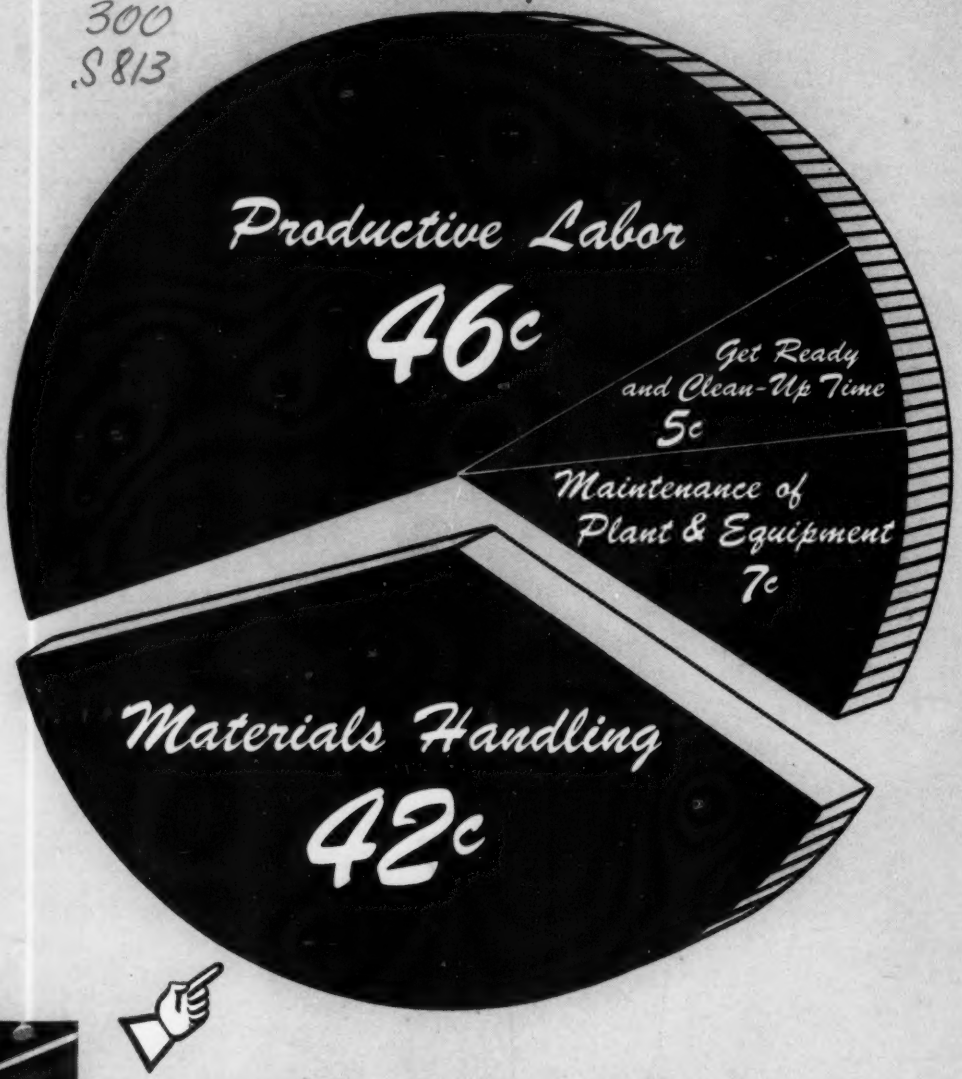
FOR STEEL MILL SERVICE

Four
BAILEY MECHANICAL VALVES
provide gas-tight closing
and dependable release of plate
for opening of intake
and discharge mains of this
KOPPERS-ELEX
Electrostatic Precipitator

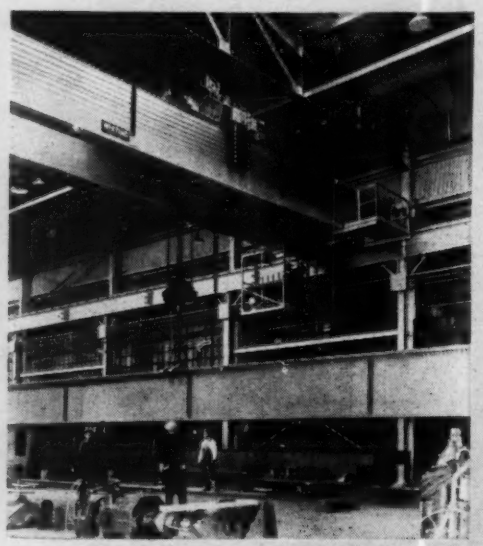
WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA

Library
TS
300
.S813

What do you get for your payroll dollar?



THIS ANALYSIS OF PAYROLL DISTRIBUTION IS THE COMPOSITE OF A NUMBER OF TYPICAL MANUFACTURING OPERATIONS



HERE YOU CAN SAVE!

While worker incentives, simplified processes, and improved machinery have steadily reduced productive labor costs, similar progress has *not* been made in handling materials and work in process. Yet materials handling represents nearly half the activity of the average plant.

Streamlining materials-handling methods offers today's greatest opportunity for reducing manufacturing costs!

Whiting Crane Engineers can show you how to handle materials and products efficiently, without sacrificing floor space or interfering with productive workers. Whiting Corporation, 15643 Lathrop Ave., Harvey, Illinois.

W.M.

BUILDERS OF QUALITY CRANES FOR OVER 60 YEARS

Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, and St. Louis. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church St., New York 7, N. Y.

Dependable · · Quiet-Running · · Durable

WHITING Overhead Traveling CRANES

E. Eng. Lib.
Water

COUNT

Mechanically...

Strokes, revolutions, pieces, volumes, lengths . . . or other units of performance and production . . . can be counted by Veeder-Root Mechanical Counters like this new General-Purpose No. 1260. This direct-reading, streamlined counter counts up to 1,000,000 . . . then resets (unless you want to reset it sooner) with one turn of knob. And it's *compact,* so it can be *built into* most machines and products, to add utility and marketability.

Magnetically...

To report machine output direct from plant to office . . . or to count units of a size or weight that makes them tough to count mechanically . . . count on these new Veeder-Root Reset Magnetic Counters, No. 1205 for AC, No. 1248 for DC. Easy to install on regular light circuit . . . widely used with "electric eye." And they may be grouped on panels, at any distance from the machines they report on.

Manually...

To count people, poles, shrubs, blood-corpuscles, cars, ticket-buyers . . . or anything that can't be counted mechanically or magnetically . . . count on this No. 1023 Hand Tally that fits both hand and pocket. To count one, press thumb-lever once. When count is complete, turn reset knob, start over from zero. Ends errors from memory-count and pencil tallies.

These are only 3 of the scores of types of Veeder-Root Standard and Special Counters. Most likely you, too, can count on Veeder-Root, to your profit. Write.

ON VEEDER-ROOT

VEEDER-ROOT INCORPORATED
HARTFORD 2, CONNECTICUT
In Canada: Veeder-Root of Canada, Ltd., 955 St. James St., Montreal 3.
In Great Britain: Veeder-Root Ltd., Kilspindie Rd., Dundee, Scotland

Behind the Scenes...

Feel Like Retiring?

This week we have with us a magnus opus. That's Latin for anything we want to call your attention to, and this is certainly in that category. For the past several weeks Associate Editor Walt Campbell has been rapidly turning himself into an expert. He's been learning more and more about pensions and the fourth round wage demands until he now knows about all there is to know as of April 4, 1949. And while he's been learning, he's been writing, too, so that the net result can be shared with you readers. The special report you'll find somewhere west of here on cream colored paper is probably the most complete handbook on the subject which has yet been assembled. Mr. Campbell has literally combed the country for material, having drawn from government, from labor, from industry and from history. If the people responsible for labor relations and personnel in your plant don't have their own personal subscriptions to STEEL, better grab the phone right now and tell them about this article, so they can hotfoot it over and read it. Or, better yet, grab the phone and call our circulation department. They'll be glad to enter a subscription or two, and see to it that copies of this article are sent post haste. For your convenience, we've included in the column to your immediate right the subscription rates, our phone number and address, and the names of a couple of people in our circ. dept.

Green Faces Dept.

Somehow we slipped up on our intentions last month. We intended to comment on the opening of the Shamrock Hotel, which nearly everyone must know by now is in Houston, Tex. Along with all the show elsewhere, STEEL did its bit by carrying a page of advertising in the March 7 issue. More later, our adv. dept. tells us. We note also among the welter of publicity on the Shamrock that they have thinking elevators. This is indeed an innovation, since most of the elevators of our acquaintance don't stop to think. In fact, when we are in a hurry, they never stop at all!

Chips from the Ships

Our wandering circulationist, Gary Hewitt, says that he has discovered a new industry flourishing out on the west coast. Seems that in the haste, hustle and bustle of war production, the crew that swept out the war plants picked out a big open place and emptied their sweepers there, day in and day out. Net result was a mountain of dust, dirt, and corruption. Included in the corruption, however, were tons and tons of metal chips, broken parts and the like. Now an enterprising entrepreneur has emulated his eastern brethren who are combing the steel mill slag dumps for scrap. With the aid of a steam shovel and magnets, he is combing the sweepings, coming up with tons of usable steel scrap. Hope the price holds up long enough for him to get all of it to market!

Puzzle Corner

Karl Keefer of Dayton sent in the first right answer to our innocent appearing puzzle of a fortnight ago. The smallest number satisfying the conditions of the problem is 217391-3043478260869565. There are several other answers—in fact they are numerous, but all larger than this one. Here's a problem in logic for you: On an island in the Pacific lived two tribes of natives, the Rites and the Rongs. The Rites invariably told the truth, while the Rongs told nothing but lies. A stranger landed on the island, and met three natives. One of the natives mumbled something which the stranger did not catch. The second native said, "He said he was a Rong." The third native piped up, "you're a liar. He did not." The stranger knew immediately to which tribe the third native belonged. Do you?

Back Fifty

Fifty years ago, on April 6, 1889, our editor lists thirty-eight companies which have been purchased by a syndicate and consolidated to form the Republic Iron & Steel Co. Myron C. Wick has been prominently mentioned as the probable new president. In Youngstown the William Tod Co. was incorporated, and in the market, prices were beginning to level off. Several steel plants announced a 10% wage increase, and the Amalgamated Association announced a mass meeting to be held in Pittsburgh. The increase brings the rate for common labor up to $1.40 per day, according to the Carnegie Steel Co.

Shrdlu

(Editorial Index—Page 53)

STEEL

Vol. 124—No. 14 April 4, 1949

BUSINESS STAFF

GEORGE O. HAYS
Business Manager

ADVERTISING

R. C. JAENKE
Advertising Manager

C. H. BAILEY
Service Manager

A. V. ANDERSON
Production Manager

New York:
E. W. KREUTZBERG, K. A. ZOLLNER
CALVIN FISHER, JR.

Pittsburgh:
S. H. JASPER, B. C. SNELL

Chicago:
L. C. PELOTT, V. G. BRETTMAN

Cleveland:
D. C. KIEFER, H. G. ROWLAND
W. L. POLAND

Los Angeles:
F. J. FULLER

•

CIRCULATION AND MARKET RESEARCH

J. W. ZUBER
Director

R. L. HARTFORD
Research Manager

H. E. METZNER
Circulation

G. R. EBERSOLE
Mail & List Service

Field Representatives:
C. A. PRICE, H. R. DUNNE, D. G. HEWITT
B. W. SCHEINERT

•

MAIN OFFICE

Penton Building, Cleveland 13, Ohio
Main 8260

BRANCH OFFICE

New York 17 ..... 16 East 43rd St.
Murray Hill 2-2581

Chicago 11 ..... 520 North Michigan Ave
Whitehall 4-1234

Pittsburgh 19 ..... 2806 Koppers Bldg.
Atlantic 3211

Los Angeles 4 130 N. New Hampshire Ave.
Fairfax 1758

London: 2 Caxton St., Westminster, S.W.1

• • •

Published by THE PENTON PUBLISHING Co., Penton Building, Cleveland 13, Ohio, E. L. SHANER, Chairman and Treasurer; G. O. HAYS, President; R. C. JAENKE, Vice President; F. G. STEINEBACH, Vice President and Secretary; E. L. WERNER, Assistant Treasurer. Member, Audit Bureau of Circulations; Controlled Circulation Audit, Inc.; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $10; two years $15; all other countries, one year $18. Single copies (current issues) 35c. Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1949 by the Penton Publishing Co.

Editorial Staff on Contents Page

Engineering News
ON ABRASIVE PRODUCTS

MX Discs and MX Depressed Center Wheels Offer Advantages in Many Applications

Fast cutting...long life...ease in use...and, safety—these are four reasons why MX Discs and MX Depressed Center Wheels by CARBORUNDUM are getting increased use. Their sharp cutting action and extra durability are especially desirable on operations that prove too heavy for ordinary sander discs. They are particularly effective on rough jagged surfaces presenting a severe dressing problem. They are also effective on such jobs as smoothing castings and welds, stock removal and clean-up work, where wearability rather than extreme flexibility is the important factor. They are usable down to practically the arbor hole.

MX Discs and Wheels by CARBORUNDUM are available in 7″ and 9⅛″ diameters for use on all standard portable disc sanders, air or electric. To obtain maximum safety, full sander pad support is recommended. The D2N.S. sander pad is provided for this purpose.

Correct Selection of Abrasive Grains Results in Improved Polishing

The abrasive grain is the key to uniform finish in polishing a metal surface. For this reason, different types of abrasives by CARBORUNDUM have been developed, with definite characteristics, to provide efficient performance under varying conditions.

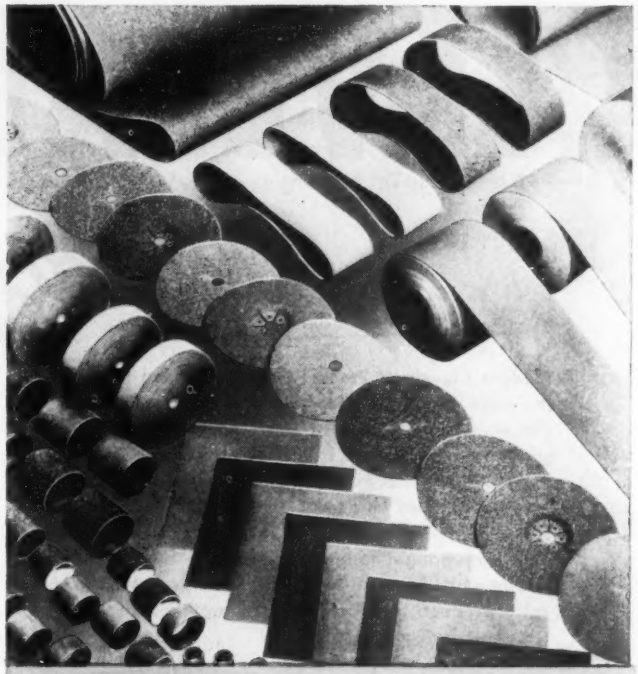
ALOXITE TP aluminum oxide grain is tough and blocky. It gives excellent service on operations involving considerable stock removal and is recommended for polishing all types of steel and other metals of high tensile strength.

ALOXITE TPT grain is also used where the removal of large amounts of metal is desirable. It is extra tough and sharp, treated to assure effective adhesion with cold cement or glue.

ALOXITE TPC grain is of medium sharpness and is treated to assure effective adhesion with cold cement.

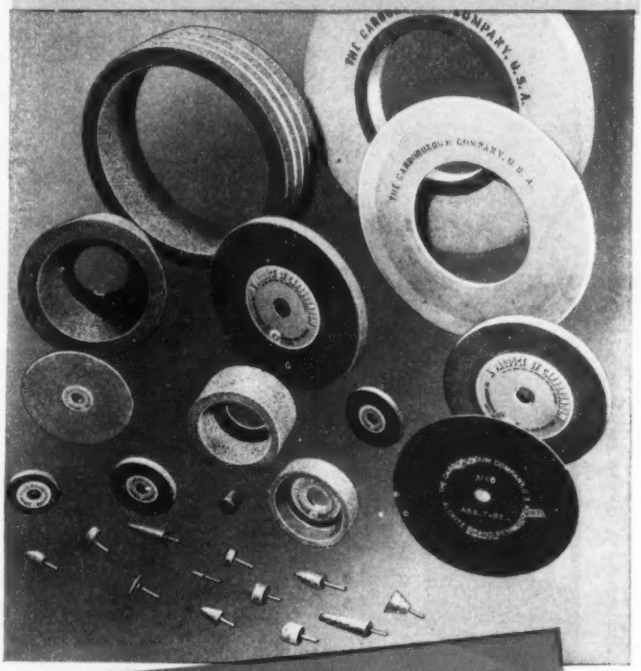
ALOXITE TPL is extremely sharp and friable. Due to its friable nature, it fractures during use, constantly presenting new sharp-cutting edges to the work surface. Loading is minimized. It is ideal for polishing metals of low tensile strength.

Accurate grading assures a uniform size, free from oversize material that cause deep scratches, and free from an excess of finer materials that tend to slow production. The angular shape assures maximum cutting edges. Flats and slivers, with no cutting value, are eliminated. Through chemical and physical controls, grains of uniform strength and temper are assured.



COATED PRODUCTS — SHEETS • ROLLS • BELTS • DISCS SPECIAL SHAPES

BONDED PRODUCTS — ABRASIVE WHEELS • STICKS, STONES AND RUBS • SPECIALTIES • SUPERFINISHING STONES • SPECIAL FORMS • ABRASIVE GRAINS AND FINISHING COMPOUNDS



FOR EVERY ABRASIVE APPLICATION ...CALL IN

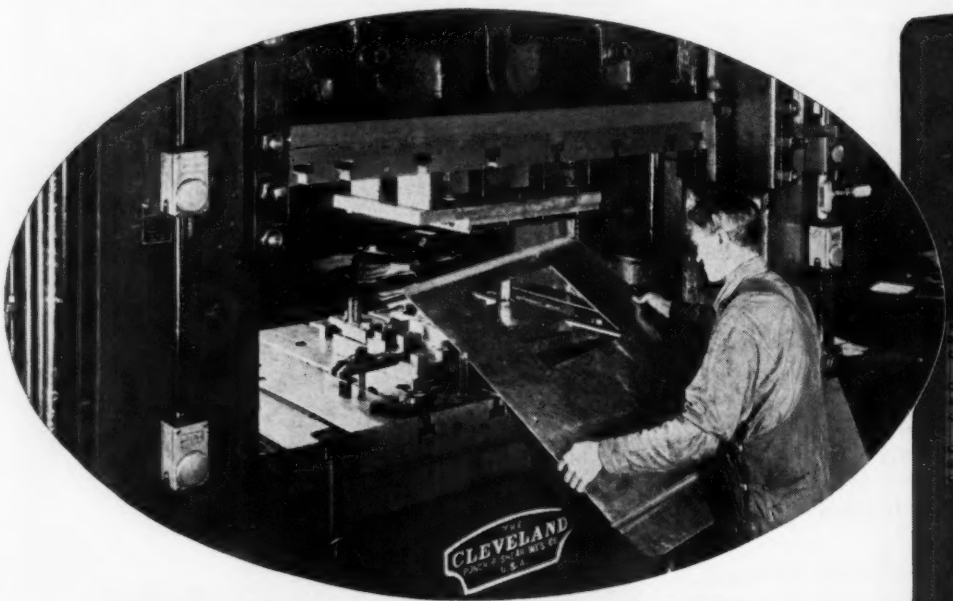
CARBORUNDUM
TRADE MARK

CLEVELAND'S ARE RUGGED

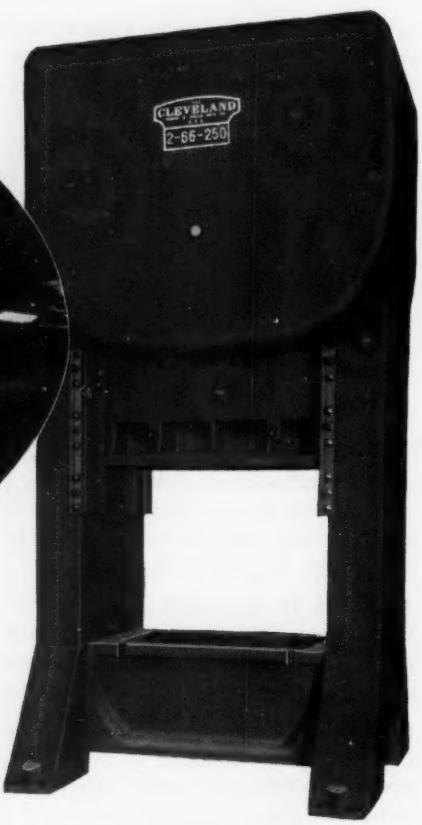
Accuracy Assured

Modern Cleveland Presses have been used for years at the main plant of the Iron Fireman Manufacturing Co. in Cleveland, to stamp out parts varying from 7 to 20 gauge. The men at the Iron Fireman who are responsible for the steady flow of accurate parts have found, by experience, that Modern Cleveland Presses are ideally suited for the production of large and irregular shapes of heavy gauge material, as well as for difficult light gauge work. The ability of Cleveland Presses to economically produce the diversity of stampings used in the construction of Iron Fireman products is due, in large measure, to the sound designing of Modern Cleveland Presses, plus their rugged construction which assures the utmost rigidity and constant accuracy of alignment between the slide and the bed, thereby eliminating undue deflection under load.

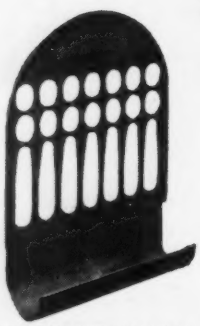
CLEVELAND offers higher manufacturing efficiency at lower operating cost with a complete range of fourteen types of Presses in sizes and capacities to meet your particular requirements.



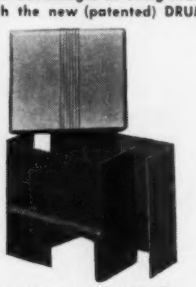
Investigate the advantages of using MODERN CLEVELAND PRESSES equipped with the new (patented) DRUM TYPE CLUTCH & BRAKE.



Cleveland Two Point Press equipped with electrically controlled air operated friction clutch. Stroke of slide 12", adjustment of slide 5", shut height 20", strokes per minute 20, area of bed 40" x 66", capacity 250 tons.



IRON FIREMAN FURNACE TOP —7 gauge steel



IRON FIREMAN ENCLOSURE—for bin-fed stoker, 20 gauge steel

IRON FIREMAN BOTTOM—for domestic stoker, 7 gauge steel

WRITE FOR BULLETIN (41)

THE CLEVELAND PUNCH & SHEAR WORKS CO.
U. S. A.

PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK.... CHICAGO
DETROIT.... PHILADELPHIA
PITTSBURGH

Established 1880

• • • • • POWER PRESSES • • • • •

FABRICATING TOOLS

CLEVELAND 14, OHIO

EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

IRWIN H. SUCH
Editor

WM. M. ROONEY
News and Market Editor

JAY DEEULIS
Engineering Editor

J. D. KNOX
Steel Plant Editor

GUY HUBBARD
Machine Tool Editor

DON S. CADOT
Art Editor

ALLEN G. GRAY
Consulting Editor

ASSOCIATE EDITORS

W. J. CAMPBELL • FRANK R. BRIGGS
VANCE BELL • WALTER F. TOERGE
DAN REEBEL

ASSISTANT EDITORS

HENRY J. HOLTZ • DOLORES K. BLAHA
JOHN S. MORGAN • L. J. SKUDERIN
EDWIN L. KARPICK • M. T. BORGERHOFF

RESIDENT EDITORS

E. C. KREUTZBERG
Washington Editor

B. K. PRICE
Eastern Editor, New York

L. E. BROWNE
Associate Editor, New York, Boston

J. C. SULLIVAN
Pittsburgh Editor

A. H. ALLEN
Detroit Editor

E. F. ROSS
Chicago Engineering Editor

HOWARD C. TUTTLE
Chicago News and Market Editor

VINCENT DELPORT
European Editor, London

EDITORIAL CORRESPONDENTS

R. W. KINCEY, *Birmingham*
L. C. FELDMANN, *Buffalo*
SAMUEL S. CARR, *Cincinnati*
MAC L. HUTCHENS, *St. Louis*
GEORGE R. REISS, *Youngstown*
BERT D. LYNN, *Los Angeles*
ROBERT BOTTORFF, *San Francisco*
R. C. HILL, *Seattle*
C. K. CATES, *Dallas*
F. S. TOBIN, *Toronto*
J. A. HORTON, *Birmingham, Eng.*
LEON JAUDOIN, *Paris, France*
JACQUES FOULON, *Liege, Belgium*
HERBERT GROSS, *Dusseldorf, Germany*

MAIN OFFICE

Penton Building, Cleveland 13, Ohio
Main 8260

BRANCH OFFICES

New York 17 ..... 16 East 43rd St.
Murray Hill 2-2581

Chicago 11 ..... 520 North Michigan Ave.
Whitehall 4-1234

Pittsburgh 19 ..... 2806 Koppers Bldg.
Atlantic 3211

Detroit 2 ..... 6560 Cass Ave.
Madison 3024

Washington 4 ... 1123 National Press Bldg.
Executive 6849

Los Angeles 28 ..... 1452 N. Seward St.
Hudson 2-4376

London 2 Caxton St., Westminster, S.W.1

Business Staff on Page 4

NEXT WEEK . . .

Hot Extrusion Methods Applied to Automotive Parts

Specified Areas Hardened by Concentrated Flame Method

Production of Bessemer Steel

Process Simplifies Cleaning of Gas Washers, Precipitators

STEEL

The Magazine of Metalworking and Metalproducing

VOL 124, NO. 14 APRIL 4, 1949

NEWS

★ As the Editor Views the News 55
★ News Summary 59
Price Shakeout Accelerates 61
Pricing Protection Held Essential Until Legal Confusion Clears 63
Farmer Again in Driver's Seat 64
Krug Urges Conservation 65
Where the Steel Went Last Year 66
Tool Exports Drop 40 Per Cent 68
Aircraft Backlogs Soar as National Rearmament Progresses 77
★ Windows of Washington 78
German Experts Estimate Reds' Steel Output Is Up 81
★ Calendar of Meetings 81
★ Mirrors of Motordom 83
Allegheny Ludlum Postwar Expansion May Cost $25 Million 86
★ Briefs 87
★ The Business Trend 88
★ Men of Industry 90
★ Obituaries 95
★ Construction and Enterprise 172

SPECIAL REPORT

Guide on Insurance and Pension Plans 69

TECHNICAL

★ Engineering News at a Glance 97
Diversified Techniques Involved in Multipurpose Quality Control 98
Electroplating Operations Combine Automatic, Bulk Processing 102
Sixth Western Metal Congress and Exposition 107
Technical Sessions 108
List of Exhibitors 126
★ Progress in Steelmaking—The Art of Roll Pass Design 112
★ New Books 130
★ New Products and Equipment 135
★ Helpful Literature 149

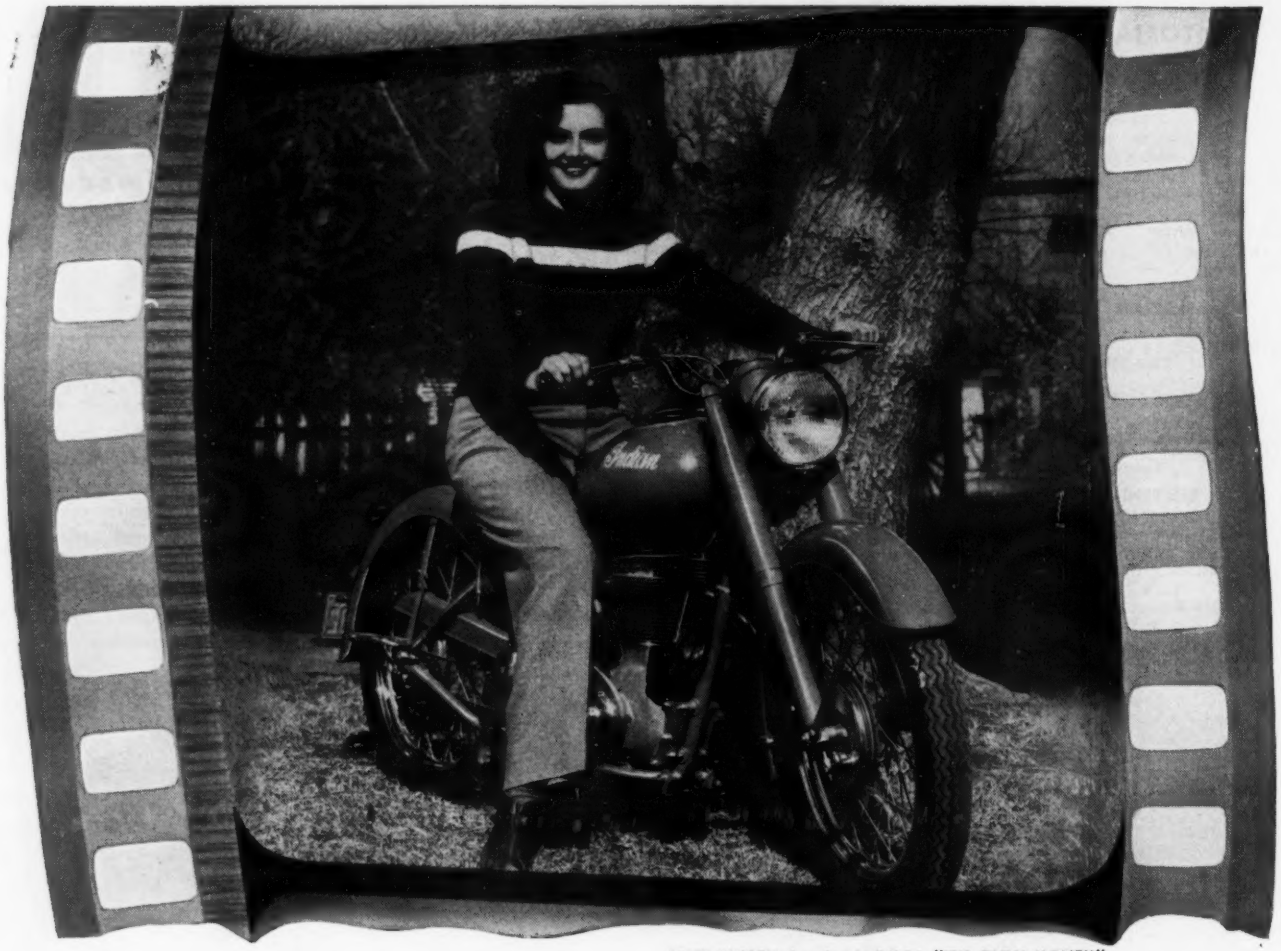
MARKETS

★ Market Summary 151
★ Market Prices and Composites 152
Copper and Lead Prices Decline 156

★ *Advertising Index* 182

Editorial Index available semiannually; STEEL also is indexed regularly by Engineering Index Inc., 29 West 39th St., New York 18

★ Denotes Regular Features.



JANE RUSSELL Starring In R K O's "IT'S ONLY MONEY"

This is more than just a Pretty Picture

OF COURSE . . . Jane Russell on her new Indian motorcycle is mighty attractive, *But* . . .

If you're a motorcycle enthusiast, you'll look further and see more. You'll find that the new Indian models are different—less than half the weight of former motorcycles—yet they deliver more horsepower per pound than any stock machine previously marketed.

Why? Some of the answers are illustrated at the right. To attain maximum *durability* and to build a *high-powered, light weight* and *safe* machine, engineers of the Indian Motocycle Company, Springfield 4, Mass., specified nickel alloy steels and irons for vital parts, including those pictured.

Centrifugally cast cylinder liners of nickel iron.
Transmission gears of 3115 type Ni-Cr steel
Indian crankshaft of 3140 Ni.Cr steel
3140 Ni-Cr steel connecting rods
EMBLEM OF INCO SERVICE
TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.

67 WALL STREET
NEW YORK 5, N. Y.

April 4, 1949

Invested Dollar Buys More

Two weeks ago on this page an analysis was presented of figures from annual reports of United States Steel Corp. showing that sales per dollar of wages in 1902 were $3.52 and in 1948 only $2.24. Several readers have suggested that a study of the statistics of other corporations would reveal equally significant trends.

Fortunately the annual report of Bethlehem Steel Co., in addition to showing that 1948 was Bethlehem's most remarkable year, also contains figures going back to 1905 which permit important comparisons. For instance, the downward drift in output per dollar of wages for Bethlehem corroborates that for United States Steel. In 1905, a wage dollar paid by Bethlehem accounted for $4.45 in sales. In 1948 the wage dollar netted only $2.69.

Equally interesting is the return in value of product per dollar invested in the business. In 1905, when Bethlehem's investment was $33.3 million, the value of products sold was $14.7 million, or 44 cents per dollar invested. In 1948, the investment was $746.3 million and the value of products sold was $1,315.2 million or $1.76 per dollar invested. Stated in another way, a dollar of sales required an investment of $2.24 in 1905 and only 57 cents in 1948. Equally important, a dollar invested in 1905 provided a half-hour of work whereas a dollar invested in 1948 provided 3.74 man-hours of work.

On the basis of these rough comparisons, it is apparent that during the past four decades the return on a dollar spent for wages has been declining while the return on a dollar invested in plant and equipment has been increasing. A painstaking study probably would show that these trends are reflected by the figures of a great majority of American industrial corporations. If so, it would appear that the present policies of the government are just the opposite of what they should be.

Under its proclaimed objective of promoting full employment, the present administration in Washington encourages higher wage rates without respect to work performed and discourages in almost every conceivable way the accumulation of funds for investment. Freezing wages until productivity catches up and encouraging investment would be a more effective way to promote employment and a healthy economy.

* * *

STRAWS IN THE WIND: Last week a number of events, occurring in rapid succession, gave welcome assurance that the fallacies of President Truman's anti-inflation program are beginning to be recognized and that opposition to his policies is growing.

Monday the Federal Reserve Board reduced the cash down payment required on stock purchases from 75 to 50 per cent of the price of the securities. On Tuesday, during debate on appropriating $5.58 billion for European recovery, Senator George, chairman of the Senate Finance Committee, urged Congress to reduce government spending and to follow Canada's example of lowering income taxes. In debate on the same subject, Senator Taft proposed that Congress cut not only the ECA appropriation but all other money bills by an average of 10 per cent.

In each of these incidents, the course taken or proposed is just the opposite of what President Truman is demanding. The easing of restrictions on stock purchases is inflationary. Mr. Truman still is advocating deflationary measures. The proposals of Senators George and

(OVER)

AS THE EDITOR VIEWS THE NEWS

Taft reflect the common sense idea that the nation, threatened with heavy necessary expenses in future years, must begin now to pare controllable expenditures to amounts it can afford to pay. President Truman's program calls for unlimited spending and higher taxes.

These straws in the wind are not conclusive, but they do afford hope that the country will veer away from the fanciful aspects of the Truman "fair deal" and will pursue more realistic policies. —p. 62

* * *

ADJUSTMENTS CONTINUE: Last week witnessed a wide range of price adjustments and a mixed situation as to employment.

The price reductions were chiefly in ferrous and nonferrous metals, scrap, and metal manufactures. Cuts in finished steel prices were confined to premium prices on certain products. Lead, zinc and copper scrap have been down sharply in recent weeks and last week primary copper dipped a quarter-cent a pound. Iron and steel scrap prices are at the lowest level in two years. Kaiser-Frazer reduced automobile prices from $198 to $333 per car and some manufacturers of appliances, storage batteries and other products announced price reductions.

Some signs indicate that the rate of increase in unemployment may be slowing down. Fresh layoffs are offset in some instances by workers recalled to their jobs. Events in April probably will give a clue as to how far the present adjustments may go before a point of stabilization is reached. —pp. 61, 62, 88

* * *

INSURANCE AND PENSIONS: For several decades some industrial corporations have been inaugurating insurance and pension plans for employees largely through the voluntary initiative of management. Beginning this year a sharply increasing number of such plans will be adopted, not as a result of voluntary action by the employer, but through collective bargaining between the employer and the unions which represent his employees.

Negotiating for a mutually satisfactory program of social security is a complicated business. Recognizing this fact, the editors of this publication asked Associate Editor Walter J. Campbell to make an exhaustive study of the subject. He has reviewed numerous plans, consulted many specialists and analyzed the demands which some unions will submit within the next few months. From this wealth of information he has prepared a concise 8-page summary of pertinent facts which should prove to be exceedingly useful to executives in the metalworking industries. —pp. 69-76

* * *

AIRCRAFT PLANTS BUSY: One of the brightest spots in the metalworking industries at the present time is the aircraft industry. Eight manufacturers — United, North American, Douglas, Lockheed, Grumman, Consolidated Vultee, Curtiss-Wright and Republic— have backlogs of orders totaling more than $1.5 billion. This volume of business is sufficient to keep the plants of these companies busy well into 1950.

The improvement in backlogs reflects the increasing momentum of the nation's rearmament program. According to census figures, the aircraft industry in 1947 shipped 17,950 planes valued at $444 million, of which 38.6 per cent by airframe weight were for the government. From the reports of individual companies, it is apparent that the government took a larger proportion of the 1948 output. It is estimated that in 1949 the government's share will be 70 to 80 per cent of the industry's production.

Noticeable in the backlog of orders is a considerable volume of engineering, development and experimental work. —p. 77

* * *

WESTERN METAL SHOW: Among the first of the large technical societies to recognize the tremendous growth of interest in problems of engineering and production in the West Coast industrial area was the American Society for Metals. The Western Metal Congress and Exposition, which will be held in Los Angeles April 11-15 under sponsorship of the society, is the sixth which has been held in West Coast cities.

In addition to the exhibit, in which 200 companies will participate, technical programs will be presented by five national technical societies. About 20 Pacific Coast chapters or sections of these and other national associations also are co-operating.

As in previous years, next week's event will place special emphasis on metals for the oil, chemical, general manufacturing, aviation and mining industries. Discussion of these subjects, coupled with the displays of new products and equipment at the show, is expected to attract an attendance of more than 10,000. —p. 107

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

BUSINESS WEATHER—Shakeout in prices of both hard and soft goods continues. Zinc, lead, copper and copper scrap prices have dropped substantially (p. 61). Premium prices on pig iron have virtually disappeared and premiums on many finished steel products are fading. Three auto manufacturers have cut list prices within the past six weeks and others are expected to follow. Household appliances are being reduced. The seller now is going to the customer and steel mills which a few months ago were withdrawing from remote areas now are re-entering those areas with offers of tonnage (p. 151). The softening in the price structure has taken much of the urgency out of the President's anti-inflation program (p. 62) and administration leaders in Congress say it will not be pushed.

WHAT PRICE SECURITY?—Primary issue in bargaining conferences between metalworking companies and the unions this year will be social insurance and pensions. These union demands will be tremendous in point of cost and may involve billions of dollars annually for the metalworking industries. They will introduce complications not heretofore encountered at the bargaining table. A special study by STEEL (pp. 69-76) outlines the magnitude of the problem, suggests procedures for management to follow in preparing for negotiations.

STEEL DISTRIBUTION, 1948—Where does all the steel go? This was a common question throughout last year as consumers noted that while steel production was setting new peacetime records many users were unable to obtain the material they required. An answer is provided in the steel distribution figures for 1948 (pp. 66, 67).

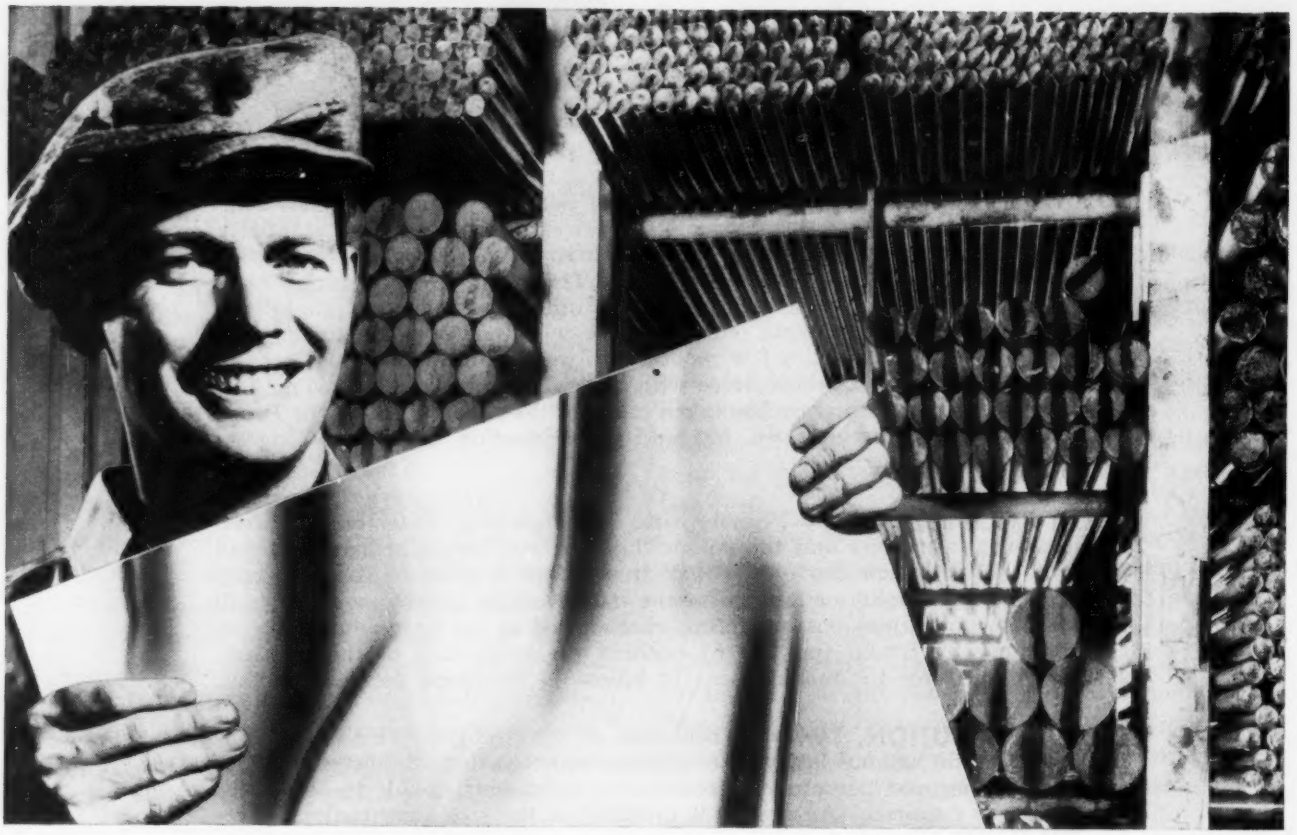
FARMERS SHOPPING—Although farm income for the first quarter of 1949 was higher than for comparable 1948 period (larger volume offsetting price declines), the farmer is becoming more price conscious in shopping for equipment (p. 64). Premium prices on some farm implements have about disappeared, and pressure for reductions in other machinery is being felt. Some implement manufacturers hope that the disappearance of gray market and conversion steel and the elimination of costly manufacturing expedients will permit shaving prices.

REARMAMENT—While industry speculates on the effect of the North Atlantic pact on demand for defense materiel, aircraft producers' backlogs of orders are substantially higher than a year ago (p. 77). Most are for government account. Meanwhile the National Security Resources Board appears to have reached a stalemate in setting up the nucleus of a mobilization organization (p. 78), due largely to indecision on the part of the administration.

EUROPE— German steel authorities estimate Russian production last year amounted to 26.4 million tons of steel and that output of her Eastern European satellites raised the total for the Iron Curtain bloc to about 33 million tons (p. 81). This estimate is considerably higher than those made by British and American authorities. The difficulty of obtaining any reliable figures on Russian output opens all estimates on Soviet production to question.

EXPORTS— American exports of machine tools and parts in 1948 dropped 40 per cent below the 1947 volume (p. 68). Largest decline occurred in shipments to Russia and her satellites. Machine tool builders are wondering whether the rehabilitation of European industry, combined with a shortage of dollar exchange, import restrictions and bilateral trade and barter arrangements, will cut deeply into American export markets.

HERE AND THERE IN INDUSTRY—Chrysler engineers are working overtime (p. 84), leading to speculation that work on shorter-wheelbase versions of Dodge and Plymouth is being speeded to meet price competition . . . Wheeling Steel is operating its new continuous tube mill at Benwood Works (p. 86) on a test basis . . . Department of Commerce is at work on a study of steel capacity needs (p. 78) . . . Government is contemplating purchase of three 60,000-ton hydraulic presses for cold forging of aircraft parts (p. 80) . . . General Motors will open its "Transportation Unlimited" show at Detroit next week (p. 83).



For Quick Service on Stainless Bars, Pipe, Sheets, etc.

Your nearby Ryerson plant is a quick, convenient source for everything in stainless steel. Bars, plates, sheets, tubing, pipe and other stainless products in many types and finishes are on hand for immediate shipment. And stainless from Ryerson stocks means Allegheny stainless, the time-tested product of America's oldest stainless producer.

Durable Allegheny stainless steel provides dependable protection against corrosion and high heat resistance. Its versatility, gleaming beauty and *immediate availability* frequently make it the practical metal for many uses where other steels are usually specified.

Expert technical assistance in determining the kind of stainless best suited to your special needs is available at all thirteen Ryerson plants. You can rely on it because more than a quarter of a century of stainless experience stands behind the recommendations of Ryerson stainless specialists.

So draw on complete Ryerson Allegheny Stainless stocks and be assured of quick shipment, anywhere —and dependable service. Contact the nearest Ryerson plant for all your requirements.

PRINCIPAL PRODUCTS

BARS—Carbon & alloy, hot rolled & cold finished

STAINLESS—Allegheny metal plates, sheets, bars, etc.

STRUCTURALS—Channels, angles, beams, etc.

PLATES—Sheared & U. M., Inland 4-Way Floor Plate

TUBING—Seamless & welded mechanical & boiler tubes

SHEETS—Hot & cold rolled, many types & coatings

MACHINERY & TOOLS—For metal working

RYERSON CERTIFIED STEELS

RYERSON STEEL

Joseph T. Ryerson & Son, Inc. Plants at: New York • Boston • Philadelphia • Detroit • Cincinnati Cleveland • Pittsburgh • Buffalo • Chicago • Milwaukee • St. Louis • Los Angeles • San Francisco

STEEL
A PENTON PUBLICATION

Price Shakeout Accelerates

Premiums on iron and steel products disappearing. Nonferrous metals continue to decline. Scrap prices skid. More reductions anticipated on automobiles. Appliances cut

A FEW more shakes were given to prices in important metal goods markets last week. Some reductions were in finished goods and may prompt other cuts by competitors. Other reductions were in raw or primary materials and by contributing to lower production costs may be reflected in future price adjustments in finished goods.

Attracting the most attention was the reduction in Kaiser-Frazer automobiles, ranging from $198 to $333 a car. Frankly a bid for a larger share of the automotive market, the cut was the first made by the company since it started in 1945. Within the past few weeks, two other motor car manufactures have reduced prices. Willys-Overland Motors Inc. lowered its quotations by $25 to $270. General Motors cut $10 to $40 at the time of its Mar. 1 wage readjustment.

Ford Predicts Further Cuts—Henry Ford II predicts that all manufacturers soon will reduce prices and that cars now selling for $1800 to $1900 can be bought for $1500

Appliance makers continue to shave list quotations. Gibson Refrigerator Co., Greenville, Mich., is offering ranges and refrigerators $10 to $20 lower. Westinghouse Electric Corp. has cut prices on some radios as much as 20 to 50 per cent, with reductions ranging up to $130 a set. Home appliance and radio prices have been weakening for several months and other major makers announced reductions earlier.

Willard Storage Battery Co. has clipped $1.50 to $2 from battery prices. Electric Storage Battery Co. cut 8 per cent. Both reflect lower lead prices.

Sears, Roebuck & Co. features many price reductions in its midseason catalogue.

Primary Metals Slide—Nonferrous metals prices have tumbled sharply within recent weeks. Lead, zinc, and copper scrap are down sharply (see chart). Primary copper dipped a quarter cent a pound last week.

Premium prices on pig iron have virtually disappeared. Lone Star Steel Co. in Texas has cut quotations from $75 to $46.50 a gross ton for low phos, southern grade iron, and to $46 a ton for standard basic iron. Kaiser Co. had dropped prices on basic iron at Ironton, Utah, from $62 a gross ton to $47. The Mystic furnace at Everett, Mass., announces second quarter prices will be 25 cents a ton lower to $52.50 for No. 2 foundry and $53 for malleable.

Premium Prices Fade—On finished products, premium prices are washing out rapidly. Since the first of the year the following companies have reduced premium prices: Granite City Steel Co., cold-rolled sheets; Follansbee Steel Corp., silicon steels; Keystone Steel & Wire Co., wire and wire products; Continental Steel Corp., wire and wire products; Pittsburgh Steel Co., wire and wire products; Northwestern Steel & Wire Co., wire and wire products; Kaiser Co., plates, shapes, carbon bars, hot-rolled sheet and hot and cold-rolled strip; Portsmouth Steel Corp., wire and wire products; Allegheny Ludlum Steel Corp., silicon steels; Jones & Laughlin Steel Corp., hot-rolled bars and structural shapes.

Premium prices continue to be charged by many producers of plates and some other products.

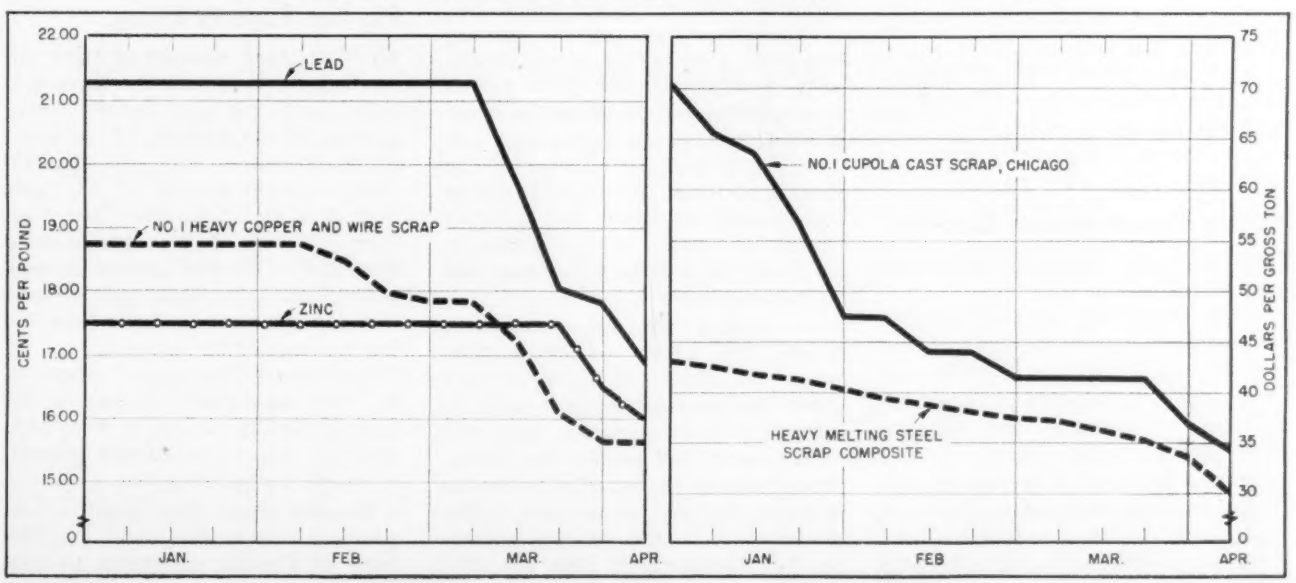
Scrap Prices Drop—Iron and steel scrap prices have declined sharply since the first of the year. Heavy melting steel has dropped from $43.25 (composite at Pittsburgh, Chicago and Philadelphia) to $33.66. No. 1. cupola cast at Chicago has declined from $70.50 to $37.

The drop in zinc prices has resulted in general decreases in prices of galvanized sheets, ranging up to $5 a ton, and in galvanized pipe by $3.

Stability Act "Urgency" Lost

DECLINES in prices, a 1.9 point drop in the cost of living from Jan. 15 to

NONFERROUS METALS, IRON AND STEEL SCRAP PRICES IN 1949



Feb 15, easing in supply of formerly scarce goods, and the action of the Federal Reserve Board in reducing to 50 per cent from 75 per cent the cash requirement for stock purchases collectively are seen as a serious blow to the administration's anti-inflation program.

Administration leaders in Congress now admit that developments of the past few months have taken the "urgency" out of the program.

The President's proposed "Stability Act of 1949" contains sweeping powers to impose price controls, channel raw materials and encourage plant expansion for basic materials such as steel.

Its proponents contend the bill's powers could be used to fight deflation as well as inflation.

Unemployment Gain Slows

UNEMPLOYMENT is continuing to gain but at a slower rate, according to federal employment officials.

Continued claims for unemployment compensation for the week of Mar. 19 increased 6900, a relatively small gain. In the comparable weeks of 1948 and 1947, such claims showed a decrease.

Some substantial layoffs by metalworking industries continue to be noted. Westinghouse Electric Corp. furloughed 1100 at its Mansfield, O., plant Apr. 4, eliminating one shift and cutting production of electric ranges by 50 per cent and of water heaters, irons and roasters by 25 per cent.

Burroughs Adding Machine Co. laid off 1500 Apr. 1 at its Detroit plant. A month ago the company dropped 522 workers. Production will be reduced in line with current sales.

Frigidaire Division of General Motors laid off 1200 workers at Dayton, O., Apr. 1.

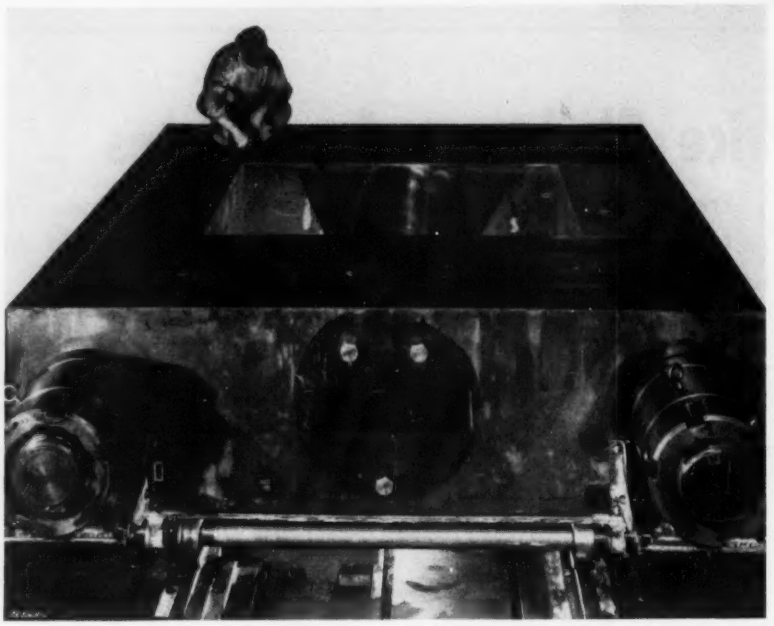
Central Iron & Steel Co., Harrisburg, Pa., has laid off 400 workers temporarily. Midvale Co., Philadelphia, has furloughed 60 to 65 workers and will increase this number to 125 or 130 within the next few weeks.

Buyers Report Decline Checked

PRODUCTION generally is being maintained and in some cases is improving, according to the business survey committee of the National Association of Purchasing Agents.

"The year-end decline in industrial activity has definitely lost momentum," the committee says.

Sixteen per cent of the reports received for March showed increased production, while 48 per cent hold a steady program of operations, many on curtailed schedules established after a 4-month decline. Sixteen per cent report some increase in order backlogs while 46 per cent maintained the February position.



CLOUD CHAMBER: Core for magnet assembly of a new Wilson cloud chamber now being erected at the Brookhaven National Laboratory, Upton, Long Island. When completed next summer, the new cloud chamber, designed to be 3000 times more effective than any chamber now in existence, will be used in the study of the cosmic ray. The core, which weighs 70 tons, was produced at the Bethlehem, Pa., plant of Bethlehem Steel Co.

Coal Mining Resumed

COAL production was resumed at most of the nation's mines last week as John L. Lewis sent his men back to work after a two-week holiday.

Coal-carrying railroads began recalling some 60,000 men laid off at the beginning of the coal strike.

Principal results of the mining stoppage: 1. Reduction in coal stocks above ground from nearly 70 million tons to between 45 and 50 million tons; 2. quick confirmation by the Senate of Dr. James Boyd as director of the Bureau of Mines, in protest to whose appointment Mr. Lewis said he called the strike; 3. loss of $55 million in wages by the miners, plus wages lost by railroad workers.

In sending the miners back to work, Mr. Lewis intimated they might be called out again in July when the current contract expires. Although wage demands have not been announced formally, the United Mine Workers are expected to ask for a 6-hour day and an increase in the contribution to the miners' welfare fund to 40 cents a ton from the present 20 cents a ton. Actuaries estimate 40 or 41 cents a ton is necessary to maintain the miners' pension fund on a sound basis.

Mine Cuts Wages 75 Cents

WAGE reductions of 75 cents a day have been announced by the Nellie B. Mining Co., Cardin, Okla. Company mines zinc and lead and attributes the wage cut to reductions in the prices of these nonferrous metals.

Pig Iron Exports Rising

SIGNIFICANT reversal of tight pig iron supply conditions that have prevailed over the past several years is seen in the booking of an order for 40,000 tons of basic iron for shipment to Great Britain by the Lone Star Steel Co., Lone Star, Tex. Further evidence of the change from shortage to surplus supply is seen in the inquiry for 60,000 tons of basic iron for shipment to Japan now being entertained by sellers.

As reported in STEEL (Mar. 28, p. 148) Lone Star will ship 40,000 tons to the British Iron & Steel Ltd., which represents consumers generally in the United Kingdom.

Exports Have Been Small — Last year pig iron exports, most of which went to Canada, amounted to 6826

tons, and in the preceding year totaled 9768 tons. Meanwhile, 29,129 tons of iron were imported into this country in 1947 and 195,269 tons in 1948. Imports since the first of this year have been light.

Sale of 40,000 tons of pig iron to Great Britain indicates that American sellers are once again competitive with foreign producers who have been able to ship here only so long as American supplies were scarce and American consumers found it necessary to pay high premiums over the domestic market. Little iron, it is recalled, has been brought into this country over past months at much under $70 c.i.f. port.

Leading exporters of iron to this country last year were: The Netherlands, 40,196 tons; Belgium and Luxemburg, 29,294 tons; Germany, 21,927 tons; Norway, 21,357 tons; Austria, 16,602 tons; France, 15,961 tons; Canada, 5115 tons, and Italy, 4456 tons.

Coast Steel Seen Holding

REDUCTION of prices on steel items produced at the Kaiser Co.'s Fontana, Calif., mill is not expected to effect the general level of steel prices quoted by other West Coast producers.

The Fontana cut wipes out part of the premiums, averaging $30 a ton, on Kaiser steel established last August, but in most cases it leaves some Fontana steel still priced above products of other producers. The Fontana reductions range from $10 to $39 a ton.

Not Unexpected — Kaiser's backdown from the premium price policy was not unexpected. For some time, the shift from a sellers' to a buyers' market has been under way and reports have been coming in from fabricators that they've been canceling orders for Kaiser steel.

Pricing Protection

Until legal confusion clears held essential by witnesses before Senate Judiciary group

UNANIMOUS agreement that until existing confusion as to legal pricing methods is cleared up, either by new legislation or by early decision of the Supreme Court, some protection for business is necessary, featured a meeting last week of the Senate Judiciary subcommittee.

Senators Johnson and Myers and Representative Walter testified that in the meatime a moratorium against nonconspiracy delivered price systems is essential to promote business stability, especially now that industry is entering into an era of competition.

A. J. Hazlett, sales vice president, Jones & Laughlin Steel Corp., Pittsburgh, in a brief read by his assistant, Herbert Johnson, declared that whereas most industries now find themselves in a buyer's market in which vigorous price competition is being restored the conclusion is inescapable that competitive pricing has been practically eliminated through Federal Trade Commission interpretations of the law and upheld by the courts.

Representing the entire Congress of Industrial Organizations, Otis Brubaker, research director, United Steelworkers, opposed the moratorium on the ground such action virtually would legalize delivered price systems such as formerly used by the steel industry.

Opposition to a moratorium also was expressed by George J. Burger, vice president, National Federation of Small Business Inc., who held that all that the Supreme Court did in the cement case was to outlaw an organized pricing system.

Indications are that a moratorium on new prosecutions will be agreed on, but that S. 236 will be held over to see what the Supreme Court will decide in the rigid steel conduit case. The opinion in that case, due well before the end of 1949, should, in the opinion of legislators, reveal whether legislation is necessary.

Difficulty Seen — In the meantime, the uncertainty as to what Congress may do and what the Supreme Court will rule, has taken some of the steam out of the enforcement agencies. In the Federal Trade Commission, for example, a threat to prosecutions now in progress is seen if independent use of delivered price systems is legalized; the commission foresees complications in proving when a pricing system has been arrived at individually.

A case in which this issue might come up is the steel pricing case, which, however, will go ahead as per the original plans. Trial Examiner Frank Hier has ordered the American Iron & Steel Institute and other respondents to start presentation of their defense on Apr. 12—although postponements may result from further strike motions which respondent attorneys expect to submit.

In the meantime, respondent attorneys have not been faring very well with their motions; in general, their requests to strike or limit testimony have been denied. The respondents also were rebuffed when they went over the trial examiner's head in their demand that the commission attorneys state the connection between evidence they have developed and what they seek to prove. The commission refused to consider the request.

REVISED PRODUCT ALLOTMENTS FOR VOLUNTARY STEEL ALLOCATIONS PROGRAMS

Monthly Steel Requirements (Net Tons) Beginning June 1, 1949

PROGRAMS	Plates	Shapes	Bars H.R.	Bars C.R.	Bars Reinf.	Sheet & Strip H.R.	Sheet & Strip C.R.	Sheets Galv.	Pipe & Conduit	Seamless Tubing	Tin	Semi-Finished	Rod & Wire	Rail & Accessories	Wheels & Axles	Electrical Sheets	Total
Anthracite	280	160	120			375			205					860			2000
Armed Forces { Alloy—	2120	100	3550	480		1110	300		450			1510	680				10300
Armed Forces { Carbon—	11236	7161	3181	687	3181	13318	4700	2698	5058		150	531	1849	171	150		54071
Atomic Energy	1630	3280			1490	320		110	2930	15				565			10340
Barges & Towing Vessels	8122	2591	175			82			232								11202
Base Board Radiation							890		60								950
E.C.A.	22388					6390	943	475								3198	33394
Federal Aeronautical	515	14	5		26	5			49								614
Freight Cars	81959	33788	26326			12907		1900	2485			2208			13380		174953
Grain Bins			200			200		8000									8400
Merchant Vessels	8159	1574	470			446		427	653								11729
Mining { Alloy—	1480	230	1865	115		205	5		5	50		50	5				4010
Machinery { Carbon—	10940	5000	6480	1175		2540	60		650	280		270	10	240	130		27775
Oak Ridge Pipe Line									4750								4750
Ore Cars	1025	445				722											2192
Reclamation	4716	2349	1410		3498	985			33				306			344	13641
Tank & Oil Field	7050	245	900			7680			655								16530
Tankers	25066	3866	903			243		302	1171								31551
Warm Air Heating						7500	8000	10900									26400
Total Alloy	3600	330	5415	595		1315	305		455	50		1560	685				14310
Total Carbon	183086	60473	40170	1862	8195	53713	14593	24812	18931	295	150	3009	2165	1836	13660	3542	430492
Total Alloy & Carbon	186686	60803	45585	2457	8195	55028	14898	24812	19386	345	150	4569	2850	1836	13660	3542	444802

Farmer Again in Driver's Seat

Control of agricultural equipment market seen passing from sellers' hands though all items are not yet freely available. Prices under increasing pressure

THE FARMER, traditionally one of the most exacting of purchasers, is back in control of the farm equipment market. As yet not all products are responsive to his reins; in fact he's still willing to pay premiums for some types of equipment which can save him money and increase his output. But by and large he is shopping around.

To most farm equipment makers this shift from sellers' market to buyers' market is not viewed with any great degree of concern. The farmer's demand is strong and it is effective. Farm income in the three-month period ending Mar. 31, according to government estimate, will be $6.6 billion, or about 5 per cent more than in first quarter 1948; this is accounted for by greatly increased volume despite a drop of about 10 per cent in farm product prices from last year. Trend toward lower prices in itself is reason for the farmer to seek means of upping output to keep income at its present level or increase it. This means mechanization.

Sales Gains Reported—Farmers' response to manufacturers' offering of equipment is reflected in the dollar sales volume of two prominent midwestern producers for the quarter ended Jan. 31, one company reporting a 23 per cent gain over the like quarter a year ago, and the other setting its increase at 15 per cent. Higher prices on the equipment accounted for part of this rise, but unit sales also were somewhat greater.

High production has brought into balance supply of and demand for most of the smaller implements, including small tractors. Not so easily available are large tractors, combines, threshers, corn pickers and certain other major items. A gray market currently exists in the Midwest for some of these. Corn pickers, particularly, are in short supply.

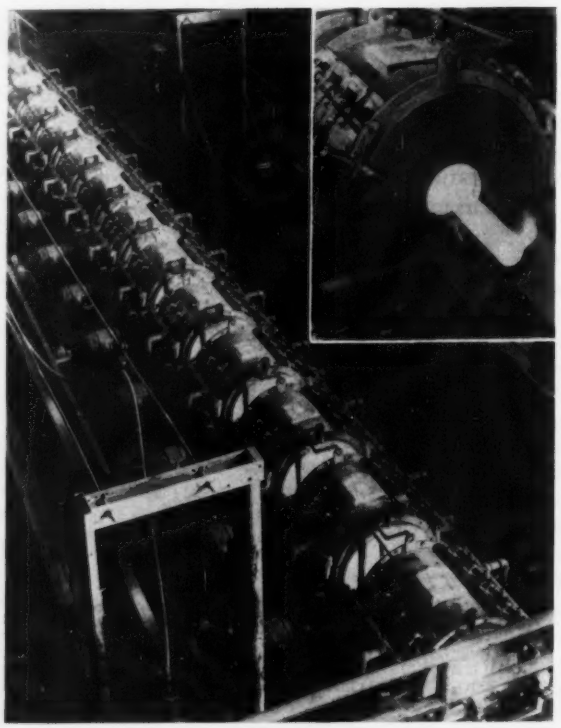
Pressure for price reductions in other machinery is quite intense; enough so, in fact, that at least one major producer has written dealers explaining that costs generally have not yet stabilized. Purchase of a new piece of equipment, the company believes, should not be deferred in anticipation of price reductions.

See Lower Costs—Some companies, however, see an important cost reducing potential now shaping up in the steel market. Premium priced material, which has been used in considerable degree by the industry, is figuring less and less in cost figures, with conversion deals now definitely on the wane and the gray market for all practical purposes a thing of the past. Better supply of mill steel is eliminating some of the production bottlenecks which have also added substantially to finished product costs in the past.

For many implement manufacturers the spring sales upturn is now beginning and expectations are for a very satisfactory year. However, a few companies, especially, relative newcomers to the industry, or ones without a full product line, are currently operating at much reduced levels. One, now working at an estimated 10 per cent of capacity, blames seasonal factors for most of the reduction but thinks the market for its products is permanently about 20 per cent lower than it had been.

Some of the equipment now in ample supply reached that point for two reasons: 1. Production was well sustained during the war, particularly as regards dairy equipment; 2. new products, especially in the tractor line, while engineered to fit the requirements of relatively small farms, have bumped into psychological resistance, higher power machines suitable for use on larger farms generally being preferred.

Gains Reported — Total value of manufacturers' shipments of complete tractors and tractor attachments and parts amounted to $962 million in 1948, an increase of 29 per cent over the $744 million in 1947, according to the Census Bureau. Increases were shown in the number and value of shipments of wheel type and tracklaying tractors but small decreases occurred in garden tractors.



FURNACE LINE-UP: From coolish red to hot yellow is the heat-color range through which unfinished seamless steel tubing passes in a line of 13 new "doughnut" reheating furnaces at National Tube Co.'s Gary, Ind., mill. Speed of steel is adjustable. Electric eyes (note cylindrical gadget focused on heated tube in insert) adjust temperature at each unit

Sponsor Malleable Study

MALLEABLE Founders' Society, Cleveland, is undertaking an expanded and continuing research program immediately, according to an announcement by C. L. Carter, president of the society. The activity will include a study of methods looking toward further improvement and development of manufacturing methods and expanded markets, as well as a special study in the field of nodular graphite iron to determine the most effective way in which the industry's facilities and know-how may be employed in the production of the new type iron.

C. A. Gutenkunst Jr., the society's research chairman, has completed arrangements for conducting the research at Southern Research Institute, Birmingham. L. J. Wise of Chicago, C. F. Lauenstein of Indianapolis and W. A. Kennedy of Providence, R. I., comprise the metallurgical advisory group which with James H. Lansing, technical and research di-

rector, Malleable Founders' Society, will co-operate in guiding the program.

Krug Urges Conservation

All-out program for developing mineral and other natural resources held imperative

QUICK action in developing an all-out program for conservation of the nation's natural resources, and discovery and development of new resources in order to maintain national strength, is urged by Secretary of the Interior J. A. Krug in his annual report to President Truman.

Warning of an alarming shortage of some vital natural resources, the secretary proposes a series of long-term investments by the government to assure future energy and mineral supplies for American industry. His recommendations include:

Development within the next 20 years of at least 40 million kilowatts of hydroelectric power, 30 million of which would be built by the federal government at an estimated cost of $12 to $15 billion. This program would include the St. Lawrence power and seaway, which Secretary Krug said was needed not only for power but also to bring in iron ore from Labrador and South America to American steel plants.

Rapid development of synthetic liquid fuels from shale and coal by private industry with government encouragement.

Employment of every available geologist to speed discovery of new mineral resources in the nation.

Restrictions on the use of scarce basic minerals such as copper, lead and zinc to protect the nation's economy from the effects of critical shortages.

Plan Manganese Conservation

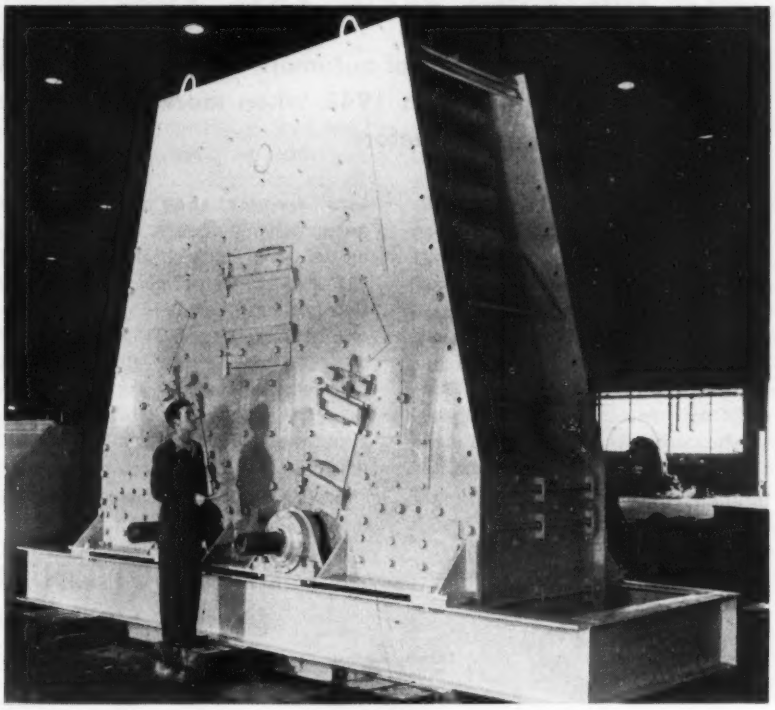
TO PREVENT any shortage of manganese in event Russian shipments continue at the present reduced rate, administration officials are working on plans for developing new sources, expanding old ones, and for making current stocks go farther.

Of most interest to steel producers and consumers is a proposal under which consumers would get steel with enough manganese content to meet their requirements but which would not contain excess amounts called for under some existing specifications.

The Department of Commerce, through the Office of Industry Co-operation, expects to start this conservation program shortly by calling in steel producers to help in setting up a voluntary allocations plan to cut the use of manganese. It is hoped that consumption can be cut from the present 13 to 14 pounds of manganese per ton of steel ingot to around 10 to 11 pounds.

Other efforts now under study or under way are: 1. Developing new deposits in Brazil and arranging necessary transportation and port facilities in Brazil; 2. rendering of assistance to India, the Union of South Africa and certain other potential sources in development work, construction of rail and port facilities, etc.; 3. encouraging larger domestic production of manganese ore, through use of subsidies if necessary.

Incidentally, plans already are under way by certain home producers which should expand domestic production of manganese ore to a level equivalent to approximately 20 per cent of domestic requirements at the present rate of consumption.



MECHANICAL STONE BREAKER: Off the assembly line of the New Holland Mfg. Co., Mountville, Pa., comes this new model of a double impeller breaker to be used in large-scale quarry operations. The 54-ton machine, said to be the largest impact-type stone breaker, swallows slabs of rock larger than an office desk and seconds later spits out crushed stone. Twin shafts flanking man in photo each carry 7-ton impellers which strike incoming stone in mid-air, throwing fragments against round bars at right. Machine is only a fraction of the size of conventional equipment doing comparable jobs by pressure crushing

Less Soviet Manganese Received

SHARP drop in imports from Russia was reported for January, giving rise to speculation with respect to future trade relations between the U. S. and the Soviet. Total imports from Russia in the month were down 75 per cent from December, falling $5 million to $1.6 million.

In the month shipments from this country to Russia amounted to only $200,000, down 60 per cent from the total of $500,000 worth of goods shipped in December.

Of particular significance was the fact imports of chrome and manganese from Russia in the month dropped to $1.2 million from $2.7 million in December.

According to reports circulating in government circles the Soviet export agency has hinted to American importers shipments cuts of 90 per cent in manganese and 40 per cent in chrome were contemplated.

Absence of specific dates or schedules for the curtailment has caused U. S. officials to surmise Russia might be using the threat as pressure to force an easing in this country's ban on shipments of industrial goods to the Soviet.

American orders for Russian manganese and chrome for 1949 are about in line with 1948 deliveries, calling for around 400,000 tons of manganese and 150,000 tons of chrome.

Where the Steel Went Last Year

Mill shipment figures reveal automotive industry dominated the distribution pattern in 1948 when more finished steel was delivered than ever before

ALTHOUGH finished steel shipments were larger in 1948 than ever before they were insufficient to fulfill demand, and a common question was, "Where's all the steel going?"

To help answer that question, STEEL has compiled figures from American Iron & Steel Institute monthly data into the accompanying tables showing mill shipments of steel to various market classifications.

Dominant in the distribution pattern are tonnages received by the automotive industry, largest consumer. Of total mill shipments of 6,747,112 net tons of cold-rolled sheets, automakers received approximately one-half, getting 3,315,969 tons. They also got nearly one-third of all hot-rolled sheets, their receipts of this product totaling 2,240,004 net tons, compared with total mill shipments of 7,086,588 tons.

Large Strip Consumer — Of total mill shipments of 1,666,200 net tons of hot-rolled strip, the automotive industry received 491,613 tons.

Approximately one-fourth of all mill shipments of hot-rolled bars went to the auto industry, its receipts totaling 2,066,774 net tons, compared with total mill shipments of 8,124,260 tons.

As a consumer of cold-finished bars the auto industry was the largest, receiving 346,229 net tons out of total mill shipments of 1,594,248 tons. However, the auto industry's receipts of this product were exceeded by those of warehouses, their total being 417,079 tons.

Large Consumer—No. 1 consumer of plates was the construction and maintenance group, its receipts of

DISTRIBUTION OF FINISHED STEEL PRODUCTS

In net tons of products of all grades, including alloy and stainless.

Market Classification	Ingots, Blooms, Billets, Slabs, Sheet Bars, Seamless Tube Rounds	Skelp	Wire Rods	Structural Shapes	Steel Piling	Plates (Sheared and Universal)	Rails, Over 60 lb.	Rails, All other	Joint Bars	Tie Plates	Track Spikes
Converters and Processors	4,434,462	480,610	449,363	37,031	2,389	763,405	20,449	4,514	43,521	986	655
Forgings (except automotive)	582,017	.....	2,765	858	.....	10,735	.....	16	.....	.....	10
Bolts, Nuts, Rivets, Screws	6,996	2,714	226,301	289	.....	1,020	.....	.....	.....	.....	1
Jobbers, Dealers, Distributors	99,590	6,293	18,314	777,412	13,374	818,431	4,700	15,380	2,438	2,374	11,250
Construction and Maintenance	68,347	13,880	18,396	1,958,800	212,351	1,746,133	30,197	6,427	1,456	3,681	1,831
Contractor's Products	14,619	3,945	8,485	12,460	45	98,702	.....	.....	.....	.....	.....
Automotive	419,142	42	8,180	30,108	.....	364,867	454	.....	.....	.....	16
Rail Transportation	72,658	.....	112	564,501	541	1,259,812	1,323,349	23,127	73,681	359,506	103,637
Shipbuilding, Marine Equip.	2,816	.....	.....	107,518	9,521	423,567	23	404	.....	.....	10
Aircraft	5,941	.....	.....	791	154	4,277	.....	.....	.....	.....	.....
Oil and Gas Drilling	47,101	43,424	74	49,967	1,439	105,819	.....	.....	.....	.....	44
Mining, Quarrying, Lumbering	2,503	25	.....	27,581	1,360	60,334	15,246	76,527	5,065	926	2,220
Agricultural	15,412	129	3,429	59,288	.....	98,579	.....	.....	.....	.....	2
Machinery, Industrial Equip., Tools	83,484	.....	29,753	239,292	98	624,278	2,328	3,050	172	21	81
Electrical Machinery, Equip.	11,451	.....	15,784	27,211	.....	83,507	.....	.....	.....	.....	8
Appliances, Utensils, Cutlery	172	.....	178	3,908	.....	8,256	.....	.....	.....	.....	.....
Other Domestic and Commercial Equip.	4,264	1,369	7,244	6,358	.....	39,977	.....	.....	.....	.....	.....
Containers	4,348	480	1,222	439	.....	39,580	.....	.....	.....	.....	.....
Ordnance, Other Military	2,849	.....	.....	8,877	1,350	9,164	.....	.....	.....	.....	.....
Export	105,546	51,066	36,082	273,822	58,349	299,927	182,053	46,154	13,451	6,245	6,528
Unclassified	435,280	64	86,295	94,804	1	506,777	410,632	40,509	40,259	116,081	20,147
Total	6,418,998	604,041	911,977	4,281,315	300,972	7,367,147	1,989,431	216,108	180,043	489,820	146,440
*Less shipments to members of industry for conversion	3,161,419	471,632	300,491	25,961	1,435	367,394	12,911	1,228	42,904	386	610
Net Total	3,257,579	132,409	611,486	4,255,354	299,537	6,999,753	1,976,520	214,880	137,139	489,434	145,830

*All of these shipments were made to the group classified as "Converters and Processors." † Included in total pipe and tubes column.

	Drawn Wire	Nails, Staples	Barbed and Twisted Wire	Woven Wire Fence	Bale Ties	Ordinary Black Plate	Chemically Treated Black Plate	Hot Dip Tin and Terne Plate	Electrolytic Tin and Terne Plate	Hot-Rolled Sheets	Cold-Rolled Sheets
Converters and Processors	888,098	19,830	1,468	6,245	142	14,051	.....	2,997	567	1,004,089	52,357
Forgings (except automotive)	3,304	.....	.....	.....	.....	.....	.....	.....	.....	41	.....
Bolts, Nuts, Rivets, Screws	322,320	146	.....	.....	.....	46	.....	.....	.....	29,260	2,684
Jobbers, Dealers, Distributors	191,546	701,270	197,211	371,653	96,153	86,890	.....	37,881	28,499	827,482	569,642
Construction and Maintenance	40,990	16,050	1,969	4,896	738	4,157	.....	1,302	180	320,688	126,728
Contractors' Products	41,154	2,589	34	102	19	30,865	.....	2,937	768	622,190	458,054
Automotive	228,523	3,804	1	3	4	8,492	.....	1,932	4,121	2,240,004	3,315,969
Rail Transportation	2,617	7,233	577	1,664	3	2,772	222	6,200	680	273,984	42,230
Shipbuilding, Marine Equip.	462	331	62	144	.....	1,919	.....	3,326	9,661	13,699	5,427
Aircraft	310	234	.....	.....	.....	.....	.....	80	43	2,116	3,667
Oil and Gas Drilling	175	221	8	.....	.....	.....	.....	193	.....	28,873	373
Mining, Quarrying, Lumbering	1,321	1,102	54	130	.....	.....	.....	.....	.....	22,530	2,800
Agricultural	39,981	2,093	279	420	663	527	.....	577	842	186,297	51,309
Machinery, Industrial Equip., Tools	122,512	5,454	32	205	343	7,243	.....	4,538	4,578	342,688	80,173
Electrical Machinery, Equip.	57,126	847	.....	21	.....	4,277	.....	1,030	1,017	230,646	138,028
Appliances, Utensils, Cutlery	50,539	635	.....	3	5	72,386	8	12,228	11,135	389,579	828,404
Other Domestic and Commercial Equip.	267,630	1,831	26	40	54	57,281	570	7,781	5,946	231,396	493,296
Containers	97,449	15,413	36	16	3,577	462,010	15,994	1,576,747	1,623,211	720,937	341,836
Ordnance, Other Military	701	1,123	235	14	.....	42	.....	124	34	3,780	5,572
Export	89,709	22,832	32,457	6,038	486	69,094	474	508,339	93,221	164,659	138,135
Unclassified	402,167	69,010	20,613	11,798	11,705	.....	.....	.....	.....	73,648	109,084
Total	2,848,634	872,048	255,062	403,392	113,892	822,052	17,268	2,168,212	1,784,503	7,728,586	6,765,768
*Less shipments to members of industry for conversion	175,358	12,508	433	3,935	.....	654	.....	300	215	641,998	18,656
Net Total	2,673,276	859,540	254,629	399,457	113,892	821,398	17,268	2,167,912	1,784,288	7,086,588	6,747,112

*All of these shipments were made to the group classified as "Converters and Processors." † Included in other sheet and strip columns.

this product being 1,746,133 net tons out of total mill shipments of 6,999,753 tons. Second place as a plate consumer was the rail transportation classification, its receipts totaling 1,259,812 tons.

Production-wise, shipments of the five leading finished steel products in 1948 followed the pattern of 1946 and 1947. These five products accounted for approximately half of all the mill shipments in the three years. Comparisons follow:

Product	1948 (Net Tons)	1947 (Net Tons)
Hot-rolled bars	8,124,260	7,983,848
Hot-rolled sheets	7,086,588	7,300,881
Plates (sheared, universal)	6,999,753	6,345,216
Cold-rolled sheets	6,747,112	5,504,578
Structural shapes ...	4,255,354	4,436,129
Totals	33,213,067	31,570,652

Largest consumer of alloy steel (other than stainless) was the automotive industry, which received 1,589,729 net tons of the total mill shipments of 4,681,784 tons. Of the 4,681,784 tons, 1,861,373 tons were hot-rolled bars.

The automotive industry was also the leading consumer of stainless steel, although the classification of appliances, utensils and cutlery was not far behind. Of total mill shipments of 325,192 net tons of stainless, 50,901 tons went to the automotive industry and 42,745 tons moved to makers of appliances, utensils and cutlery. The market classification of machinery, industrial equipment and tools received 24,571 net tons of stainless. Slightly more than half of all stainless tonnage shipped from mills was either cold-rolled strip or cold-rolled sheets, the former totaling 113,414 net tons and the latter, 77,864 tons.

Hook Sees Enough Steel Capacity

"STEEL industry has demonstrated that it can and will be able to supply all the country's needs from the plants now in operation and from scheduled increased capacity," Charles R. Hook, chairman, Armco Steel Corp., says in his annual report to stockholders.

Armco turned out 3,332,261 tons of ingots and steel castings in 1948, compared to 2,078,487 in 1947. Sales were at a new peak at $382,563,811 compared with $311,685,322 in 1947. Net earnings last year were $32,030,712.

BY MARKET CLASSIFICATION DURING 1948

Tables compiled by STEEL from American Iron & Steel Institute figures.

Hot-Rolled Bars	Cold-Finished Bars	Concrete Reinforcing Bars	Tool Steel	Standard Pipe	Oil Country Goods	Line Pipe	Conduit	Mechanical Tubing	Pressure Tubing	Miscellaneous Tubular Products	Total Pipe and Tubes	Market Classification
1,125,845	22,222	8,659	1,951	74,573	95,949	26,618	2,904	15,570	18,138	1,330	.....	....Converters and Processors
340,603	1,479	.....	475	.....	.....	.....	.....	.....	.....	.....	.....	..Forgings (except automotive)
572,393	105,350	.....	420	56	.....	.....	.....	.....	.....	.....	.....	...Bolts, Nuts, Rivets, Screws
1,205,228	417,079	605,362	13,342	1,455,645	1,052,917	528,690	127,720	152,553	86,710	64,634	.....	.Jobbers, Dealers, Distributors
401,108	5,887	669,749	237	156,721	38,073	1,152,895	1,104	34,321	37,441	31,190	.....	..Construction and Maintenance
225,044	16,122	20,772	36	99,279	154	7,902	88	8,800	31,432	9,069	.....	.....Contractors' Products
2,066,774	346,229	.....	1,447	3,750	8	57	95	128,977	1,826	266	.....	..... Automotive
449,634	7,784	2,450	275	20,786	220	338	13	1,971	19,211	607	.....	.....Rail Transportation
37,419	3,155	6	55	10,196	.....	995	25	208	3,929	2,388	.....	...Shipbuilding, Marine Equip.
5,576	4,316	.....	13	1,973	.....	289	.....	2,030	431	80	.....	..... Aircraft
117,578	7,119	26	1	8,884	284,039	23,083	.....	7,390	4,408	210	.....	.....Oil and Gas Drilling
68,901	4,589	1,371	771	7,494	712	3,004	6	686	114	6,182	.....	.Mining, Quarrying, Lumbering
603,873	87,756	776	57	22,261	8	366	23	26,905	604	4,226	.....	..... Agricultural
692,823	277,064	1,933	7,543	36,229	2,430	20,287	128	149,971	68,178	3,891	.....	.Machy., Indus. Equip., Tools
109,377	38,409	360	257	134,975	.....	692	47,948	7,135	1,236	3,156	.....	..Electrical Machinery, Equip.
19,469	55,681	51	164	13,567	.....	382	1	5,550	6,145	2,935	.....	..Appliances, Utensils, Cutlery
97,175	53,652	228	318	8,156	8	1,954	55	45,798	153	646	.....	Other Domestic and ..... Commercial Equip.
27,647	3,392	13	.....	1,758	.....	220	.....	3,531	218	12,715	.....	..... Containers
7,687	1,540	1,179	85	4,290	.....	526	.....	769	103	291	.....	.....Ordnance, Other Military
269,224	31,677	117,068	1,958	107,123	155,824	145,417	4,223	12,663	25,422	4,128	.....	..... Export
520,412	117,763	113,551	60,521	†	†	†	†	†	†	†	128,952	..... Unclassified
8,963,790	1,608,265	1,543,554	89,926	2,167,716	1,630,342	1,913,715	184,333	604,828	305,699	147,944	128,952	..... Total
839,530	14,017	6,840	1,458	55,646	92,981	25,264	2,651	7,724	16,323	921	.....	*Less shipments to members of .....Industry for conversion
8,124,260	1,594,248	1,536,714	88,468	2,112,070	1,537,361	1,888,451	181,682	597,104	289,376	147,023	128,952	..... Net Total

Cold-Rolled Sheets	Hot Dipped Galvanized Sheets	Electrolytic Galvanized Sheets	All Other Coated Sheets	Electrical Sheets and Strip	Enameling Sheets	Hot-Rolled Strip	Cold-Rolled Strip	Wheels	Axles	All Other	Total (All Products)	Per Cent	
52,357	13,287	266	10,984	286	2,461	473,881	98,629	1,506	270	2,466	10,225,024	5.31	.....Converters and Processors
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	421	942,724	1.43	..Forgings (except automotive)
2,684	56	119	23	.....	15	4,402	5,922	.....	.....	32	1,280,565	1.94	....Bolts, Nuts, Rivets, Screws
569,642	472,697	10,147	7,783	12,106	5,801	144,814	91,851	1,622	62	1,645	11,336,191	17.14	..Jobbers, Dealers, Distributors
126,728	100,277	4,512	1,315	177	2,638	81,275	23,759	4,181	1,309	317	7,327,683	11.08	..Construction and Maintenance
458,054	416,418	42,200	8,414	1,244	52,722	127,966	129,866	30	.....	2	2,494,528	3.77	.....Contractors' Products
315,969	16,374	17,938	41,779	7,994	2,452	491,613	403,197	28	8	131	10,156,605	15.36	..... Automotive
42,230	53,011	156	96	5,914	319	41,530	9,466	314,280	169,356	3,200	5,219,723	7.89	.....Rail Transportation
5,427	10,107	816	24	26	.....	852	109	6	.....	321	649,527	0.98	....Shipbuilding, Marine Equip.
3,667	323	300	.....	1,481	.....	119	844	.....	.....	49	35,437	0.05	..... Aircraft
373	542	.....	.....	18	.....	694	82	1	32	480	732,298	1.11	.....Oil and Gas Drilling
2,800	3,112	240	.....	505	.....	3,786	661	2,851	601	419	325,729	0.49	.Mining, Quarrying, Lumbering
51,309	88,016	2,712	5,494	350	100	112,192	6,383	15	.....	73	1,422,017	2.15	..... Agricultural
80,173	22,035	3,538	2,628	6,308	631	123,281	74,118	6,209	404	1,622	3,051,574	4.61	..Machy., Indus. Equip., Tools
138,028	14,344	7,765	2,655	452,266	3,606	81,159	93,850	76	8	140	1,570,367	2.37	...Electrical Machinery, Equip.
828,404	62,427	28,431	2,510	26,332	191,759	39,422	130,501	.....	.....	4	1,962,767	2.97	...Appliances, Utensils, Cutlery
493,296	26,856	30,501	2,176	5,389	9,346	70,223	211,830	.....	.....	24	1,689,551	2.56	Other Domestic and ..... Commercial Equip.
341,836	29,993	15,401	1,741	232	56	181,382	109,427	.....	.....	.....	5,291,021	8.00	..... Containers
5,572	1,941	.....	72	103	.....	1,245	1,442	.....	.....	.....	55,138	0.08	.....Ordnance, Other Military
138,135	57,565	1,631	3,288	25,342	2,183	57,671	20,399	7,400	1,134	80	3,256,087	4.92	..... Export
109,084	79,421	6,921	†	†	†	4,986	304,594	206	42,864	853	3,829,918	5.79	..... Unclassified
765,768	1,468,802	173,594	90,982	546,073	274,089	2,042,493	1,716,930	338,411	216,048	12,279	72,854,474	100.00	..... Total
18,656	2,744	.....	828	.....	2,185	376,293	24,266	1,053	143	1,770	6,713,065		*Less shipments to members of .....industry for conversion
747,112	1,465,058	173,594	90,154	546,073	271,904	1,666,200	1,692,664	337,358	215,905	10,509	66,141,409		..... Net Total

Tool Exports Drop 40%

Biggest reduction occurs in shipments to Russia and eastern European satellites

MACHINE tool manufacturers, well aware that they were selling less product for export in 1948, are shown by Department of Commerce preliminary figures to have sustained a reduction of 40 per cent last year compared with 1947.

The cut would have been even greater had it not been for business paid for by the Economic Cooperation Administration or from ECA loans. The 1948 exports of 35 classifications of machine tools and machine tool parts, came to $72,068,549, which compared with $118,829,723 in 1947. Biggest reduction came from Iron Curtain countries; Russian take of United States machine tools in 1948 was $1,963,523 in 1948 compared with $15,851,001 in 1947.

Exports to the larger consuming countries in the two years were as follows:

	1947	1948
Canada	$10,038,937	$8,562,780
Mexico	3,056,571	1,752,368
Venezuela	983,218	1,024,214
Colombia	1,072,696	623,114
Chile	812,813	1,058,723
Brazil	4,509,947	2,103,220
Argentina	7,078,885	4,186,668
Sweden	8,562,593	2,274,450
United Kingdom	9,624,056	10,324,424
Belgium-Luxembourg	3,698,579	2,704,380
France	13,006,344	6,915,008
Austria	383,379	1,276,737
Switzerland	3,307,143	3,506,155
Italy	463,497	2,633,160
India	1,779,557	2,428,834
Australia	3,414,799	1,162,740
Union of South Africa	1,766,975	1,394,566
U. S. S. R.	15,851,001	1,963,523
Czechoslovakia	1,643,051	458,179
Poland and Danzig	4,990,110	2,910,256
Yugoslavia	2,262,696	38,001

Exports of machine tools and parts by world areas were as follows in 1948:

Asia	$5,442,758
Oceania	1,300,403
Africa	2,371,242
South America	10,096,516
Europe	41,409,949
North America	11,447,681
Total	$72,068,549

Foreign Competition Rises

REVIVAL in European production of machinery and equipment under the stimulus of postwar demand, and aided by the Marshall Plan, is threatening to cut into foreign demand for American products.

Lack of dollar exchange, foreign government import restrictions, necessity for buying lower-priced items and bilateral trade arrangements are factors helping divert foreign purchasing.

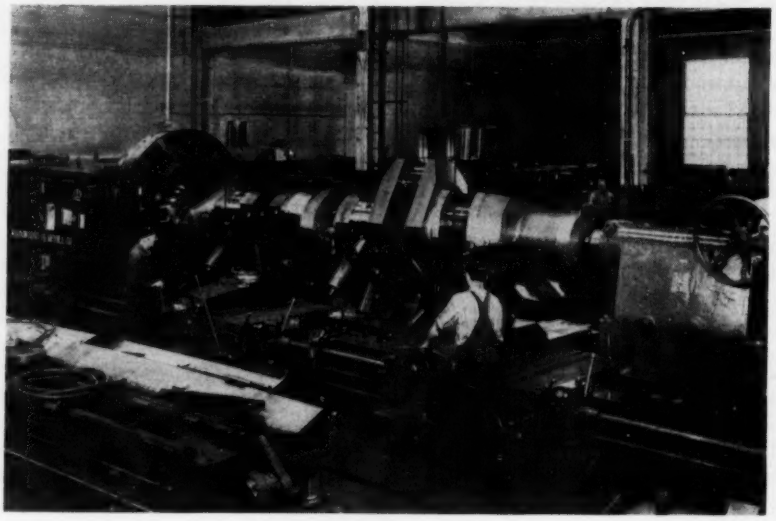
Germany Sells Machinery — Trade agreements between Bizonal Germany and various countries call for sales of German-made machinery. Included are three large orders for turbines, paper machinery and printing presses.

The Argentine government will import machinery and equipment from Denmark valued at $6,240,000, including diesel motors for ships, motors, cold storage machinery, dairy industry equipment, road construction machinery, machine tools, agricultural implements and shoe machinery.

Cuba Buys in U. S. — Machinery and other installations for three new milk processing plants in Cuba, however, have been purchased in the United States.

Negotiations are being conducted between representatives of a new corporation in El Salvador and United States interests for machinery and equipment for some new organic fertilizer plants.

In Haiti, construction equipment to be used in an irrigation project in the fertile Artibonite valley, is being financed through the U. S. Export-Import Bank which has authorized a $4 million credit. Some $800,000 is earmarked for United States equipment material and service fees. Total cost of the project is $6 million.



MACHINING DIESEL CRANKSHAFT: Half of a crankshaft for 10-cylinder, 7100-horsepower diesel stationary engine is shown being machined on a lathe at Nordberg Mfg. Co., Milwaukee. The crankshaft section is a single forging 23½ feet long and weighs 22 tons. Lathe was built by Mackintosh-Hemphill Co., Pittsburgh, and is 84-inches by 50 feet. A 75-horsepower motor drives the headstock

Replacement Problem Grows

PROBLEM of replacing industrial facilities, costs of which have doubled and in some cases tripled since before the war, has been troubling metalworking executives who point to the need for government action to permit more rapid depreciation for income tax purposes during years of high production and earnings. T. M. Girdler, chairman, and C. M. White, president, Republic Steel Corp., reveal their company has adopted a new depreciation policy, charging $7 million to accelerated depletion for 1948.

Related to Actual Costs — They draw attention to the fact that the American Institute of Accountants has taken the position, which has the support of the Securities & Exchange Commission, that depreciation must be related to the actual dollar cost of facilities regardless of the relative value of dollars when the expenditures were made. The corporation has adopted this stand. Its 1948 policy is based on actual costs, and the accelerated depreciation of $7 million charged to last year's income is applicable to capital expenditures made in 1946, 1947 and 1948. The method employed in 1947 for depreciation used replacement cost as a basis for calculations. In that year a charge of $4 million was made for excess replacement costs.

The total of accelerated depreciation and regular depreciation, under the new method, will be limited to total cost. In its 1948 report Republic charges $24,319,875 as a provision for depreciation and depletion of properties, plants and equipment. This sum includes the accelerated depreciation of $7 million.

Republic's capital expenditures last year totaled more than $31.5 million, and nearly $85.5 million has been spent on expansion in the past three years.

STEEL
A PENTON PUBLICATION
APRIL 4, 1949

A Guide for Metalworking Executives on . . . .

INSURANCE AND PENSION PLANS

By WALTER J. CAMPBELL
Associate Editor

Unions' welfare demands may cost metalworking industries billions of dollars annually. Law requires employers to bargain in good faith on labor's proposals. Development of pension programs involves many tricky actuarial and legal angles

COLLECTIVE bargaining in 1949 and subsequent years will be complicated by the injection of a new type of demand by organized labor—for social security from industry.

Within the next 90 days many metalworking companies will come face to face with union proposals for: 1. Social insurance, including group life, accident and sickness benefits, hospitalization, and medical and surgical expense reimbursement; and 2. pensions.

Not only will the demands be large in point of cost, but they involve many intricacies and complexities which make them unusually difficult subjects for collective bargaining. Particularly is this true of pension plans, which inherently are long-term programs and not amenable to easy or frequent change.

Major metalworking unions have indicated they will make the social security demands the primary issue in 1949. They may drop straight wage demands if they see a chance to gain new or improve on present insurance and pension programs.

To bargain successfully on welfare and pension programs, the employer must be prepared with sound factual and actuarial data and informed on the implications of the various proposals that may be advanced. While the cost of group insurance programs can be figured within reasonable tolerances, estimating the cost of a pension program and evaluating the ability of the company to absorb this continuing obligation over a long period of years are exceedingly tricky tasks. Faulty forecasts of future conditions and costs may prove severely embarrassing or even disastrous in years to come.

The unions will come to the bargaining table with their cases well prepared. They have employed top-level statisticians and welfare experts to help formulate their programs. They will have estimates of costs and recommendations for types of plans, eligibility requirements, administration, etc.

By comparison, the employer who does not inform himself of the facts of welfare programs in advance may find himself a sitting duck at the bargaining conference.

What will pensions cost? Figures will vary widely from company to company and from plan to plan. Should the average pension plan cost be 10 cents an hour, the total cost to the metalworking industry would amount to $1250 million annually. Each additional cent of cost would add $125 million to the industry's pension bill.

At the same time that labor is making its drive for social security from industry, it also is pushing another campaign—for increased social security through the government—which may raise employers' costs tremendously. A bill to liberalize old-age and survivors benefits now before Congress would cost the metalworking industry an additional $260 mil-

lion annually—on top of the $188 million now being collected. And that is saying nothing about the costs of proposed measures to provide national health insurance, more generous unemployment compensation, and disability insurance. Unfortunately, employers cannot await the outcome of the social insurance proposals before Congress before undertaking bargaining on the union demands from industry.

INSURANCE

SOCIAL insurance, only an idea in 1911, already has grown to large proportions in the metalworking industries. Thousands of companies provide group life insurance and many make available to employees sickness and accident benefits, hospitalization and medical and surgical expense reimbursement.

At the beginning of 1948, group life insurance covered 17.5 million workers, about 30 per cent of all employed persons. Insurance programs were incorporated in union contracts covering 3 million workers, a fifth of all union members.

What the unions now are asking is for a broadening and unifying of these programs, liberalization of benefits, and absorption of a greater share or all of the cost by employers.

In many current contracts employees pay a large portion of the costs.

Higher Benefits Asked—Programs formulated by the big metalworking unions vary, although all are comprehensive and ask higher benefits than are now usually provided.

The United Steelworkers of America-CIO has prepared six suggested plans, for which the net cost (after dividends) varies from 8.70 to 5.24 cents an hour. Gross costs (before dividends) would range 15 to 30 per cent higher. The union has suggested that the company pay the gross cost and that the dividends be turned over to a trust fund to be jointly administered by the companies and the union.

The most generous and expensive plan, submitted to the big steel companies, asks:

1. Term life insurance equal to 18 months' earnings.
2. Paid up insurance of $1500 at retirement for age or disability.
3. Cash benefits for sickness or accident of $35 a week, beginning with fourth day of sickness and first day of accident, for not over 52 weeks.
4. Hospitalization allowance of $8 a day, plus $80 for extras during each confinement, for up to 70 days for employees, wives and minor children.
5. Reimbursement for surgical fees on standard $225 scale for employees, wives and dependents.

Union estimates total net cost per employee would be $174 annually. Union is asking that the employer bear entire cost.

Counter Offer—United States Steel countered with the following offer:

1. Term life insurance equal to 12 months' earnings.
2. Term life insurance of $1000 for employee with 25 years' service who retires at age 65 or becomes permanently disabled.
3. Cash benefits for sickness or accident of $21 a week, beginning first day of accident and eighth day of sickness, for not over 13 weeks.
4. Hospitalization allowance of $6 a day for employee, $5 a day for dependents, plus ten times the daily allowance for extras, for a maximum of 31 days.
5. Surgical expense reimbursement on $150 scale for employees and dependents.

U. S. Steel proposed that companies and union share costs, estimated at about 5 cents an hour, equally. The union refused.

Other Programs—Fig. 1 presents various combinations of social insurance benefits available at gross costs of from 2.6 cents per hour to 5.2 cents per hour. These costs will vary from company to company depending on age, sex, race, number of employees and the nature of the company's operations.

Figuring Unit Costs—Murray Latimer, consultant on insurance programs, has set up a formula for the CIO for estimating net costs for the various benefits in the steel and metalworking industries. This formula is set forth in accompanying table. Gross costs quoted by commercial insurance companies will run somewhat higher and some insurance men question whether dividends will bring the net costs down to the union's estimates.

How Much Insurance?—In considering revision or adoption of a social insurance program, the selection of types and amounts to be included will depend on the circumstances and needs of employees to be covered as well as the cost the employer can afford.

Group life is the cornerstone of any program. The loss to a family of a breadwinner's earnings through his death obviously is a catastrophe. Premiums for term life insurance are low, as compared with the

Latimer Formula for Figuring Unit Costs

(Net Cost per Month in Cents)

GROUP LIFE INSURANCE

For each $1000 term insurance	64.7c
For each $1000 paid-up, as of time of age retirement	97.4c

ACCIDENT, SICKNESS

For each $10 per week, payable first day of accident, eighth day of sickness, for not exceeding:

13 weeks, 62.7c 26 weeks, 81.7c 52 weeks, 93.1c

HOSPITALIZATION

For each $1 per day for room and board, plus 10 times this amount per confinement for extras, maximum 31 days:

Employee only	12.4c
Including wife	30.8c
Wife and children	45.6c
Average all employees and dependents	41.4c

SURGICAL

Maximum	$100	$150	$225
Employee	26c	38c	57c
With Wife	83c	124c	186c
Wife, Children	108c	162c	243c
Average all employees and dependents	97c	144c	215c

INSURANCE PROGRAMS

	2.6¢ AN HOUR				3.9¢ AN HOUR			5.2¢ AN HOUR		
	Plan 1	Plan 2	Plan 3	Plan 4	Plan 5	Plan 6	Plan 7	Plan 8	Plan 9	Plan 10
LIFE INSURANCE	$2000	$2000	$1500	$1000	$1500	$3000	$2000	$2000	$1500	$2000
ACCIDENTAL DEATH AND DISMEMBERMENT	----	----	1500	1000	1500	3000	----	2000	1500	2000
WEEKLY ACCIDENT AND SICKNESS BENEFIT	20	25	25	25	25	30	15	30	25	20
MAXIMUM MEDICAL EXPENSE	----	----	----	----	----	----	150	150	225	----
HOSPITAL EXPENSE (31 days)										
Employees:										
Room and Board (daily)	8	6	6	8	8	8	8	8	8	8
All Other Charges (max.) ...	80	30	60	80	80	80	80	80	80	80
Dependents:										
Room and Board (daily)	----	----	----	----	8	----	8	8	8	8
All Other Charges (max.) ...	----	----	----	----	80	----	80	80	80	80
MAXIMUM SURGICAL EXPENSE										
Employees	150	150	150	225	150	225	225	150	225	225
Dependents	----	----	----	----	----	----	----	150	225	225

Figures in this presentation assume the following: Life insurance rate is based on average insurance age of 45. No loadings are necessary on account of industry, age or other underwriting factors. Female employees are less than 11 per cent of total. Seventy per cent of employees have dependents. Maternity benefits are included for employees and dependents. Accident and sickness benefits start first day of accident, eighth day of sickness, and must be related to employee's earnings.

Fig. 1—Gross cost estimates of above insurance plans are by Prudential Insurance Co. of America, based on certain general assumptions for illustrative purposes. Assuming an average monthly wage of $216.67 ($50 weekly), the cost of the first four plans would be 2 per cent of payroll; plans 5, 6 and 7 would cost 3 per cent of payroll; plans 8, 9 and 10 would cost 4 per cent of payroll

benefits paid when the relatively infrequent hazard insured against occurs.

At the other end of the scale is medical coverage. Any worker can anticipate paying for a few doctor's calls each year and the cost of such service may be budgeted even by the lower-paid workers. Insurance coverage here is less necessary than hospitalization and surgical expense reimbursement where the outlays required are likely to be considerable.

Weekly sickness and accident benefits have a sound purpose in tiding an employee over a temporary disability. However, these should not be so high a proportion of earnings as to encourage malingering.

Who Pays? Usually, social insurance programs are on a contributory basis, although there are numerous instances where the employer pays all.

Many insurance counselors advise employee contributions toward the cost of the plan. Experience of the past 38 years has indicated that workers appreciate the insurance more and regard it as a cooperative action with their employers and fellow employees to help meet their family responsibilities.

Requirement of contributions by workers may help to stabilize the provisions of insurance plans. If the employer pays the entire cost, there is a tendency on the part of workers to ask for larger and larger benefits. If employees contribute, they have a better understanding of the expense involved and the demands for additional benefits will be tempered by the realization that they may be asked to make additional contributions.

Where employees contribute, however, such contributions should be kept low enough to encourage a high percentage of participation in the plan and to leave no doubt in the employee's mind that he is receiving benefits that are well worth the cost to him.

Informing Employees—A large part of the success of social insurance plans depends on the manner in which employees and their families are informed of the benefits and provisions of the program. This presentation should be simple enough to be grasped easily by the workers and their families. If the employer is bearing a major portion of the cost, this should be made clear.

Usually, insurance coverage is carried with a commercial insurance company. This not only assures

that the plan will be kept on a sound basis, but it relieves management of much detailed book work.

PENSIONS

MORE pension plans will be set up in 1949 and 1950 than in any previous years. Pension consultants, insurance companies and independent actuaries already are deluged with inquiries. Bureau of Internal Revenue officials believe the staff of the unit processing such plans may have to be increased substantially to keep pace with the increase in new plans.

Much of the increased interest in retirement programs springs from the demands of organized labor. The big CIO unions in the metalworking field, particularly the United Steelworkers and the United Auto Workers, are making welfare demands the primary issue in this year's labor contract negotiations. Pensions have been taken out of the fringe category and placed at the top of the agenda.

The union drive has been spurred by the obtaining of pensions by John L. Lewis' United Mine Workers, by the Inland Steel decision that employers must bargain with unions on pensions, and by the increased social consciousness of the importance of security for the working man in his later years.

Forward-looking metalworking executives are evaluating the probable costs of the union pension proposals, studying past experience with pension plans, and otherwise preparing to bargain intelligently with the union on this issue when the time comes. Some are taking the initiative and are preparing plans to offer to employees.

Others may be underestimating the force behind the union security proposals.

For many companies, the wage negotiations this spring and summer will bring pensions only into the discussion stage. A decision may be delayed for months or until next year. But preparation for bargaining on pensions requires time.

Pension Plans Tailor-Made—The Treasury Department in the past six years has processed about 8000 pension plans. No two were alike in every respect. Pension plans are tailored to fit the requirements of the companies for which they are intended.

Pension specialists are agreed that before a plan or even a type of plan is selected, certain data must be gathered and analyzed.

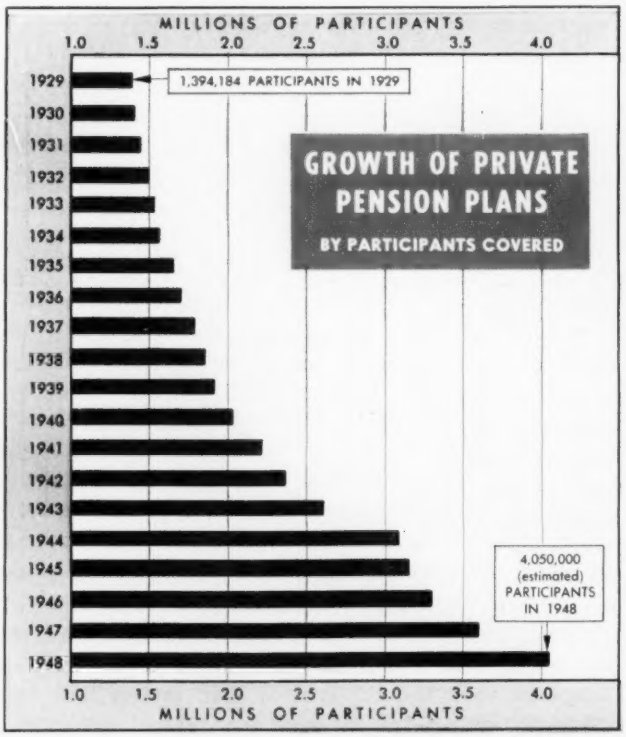
Consideration should be given to a number of facts, among which are:

1. Age, sex, length of service, earnings, turnover and mortality rate of employees.
2. Management's attitude toward the economic needs of employees.
3. Age and stability of the company, its record of earnings and prospects.
4. How much the company can afford.

Expert Advice Needed—Because the building of a pension plan involves many complicated actuarial and legal angles, because it inherently must be a long-range program and because it involves very heavy expenditures, most companies will want to retain a qualified pension consultant to help draft a plan. Such a consultant should be unbiased as regards the various types of plans available, should have an actuarial background, knowledge of the requirements of the Bureau of Internal Revenue, and experience in dealing with unions if the plan is to be negotiated. He should be readily available for consultation and in a position to give continuing service.

Three types of consultants are available: 1. Independent pension consultants or actuaries; 2. banks handling pension plans; 3. insurance companies.

After a consultant has been retained, the first order of business will be the collection and analysis of data on the company and its employees. When these statistics have been studied and management and the consultant have conferred on the magnitude of the plan desired, consideration should be given to the type of plan to be adopted.



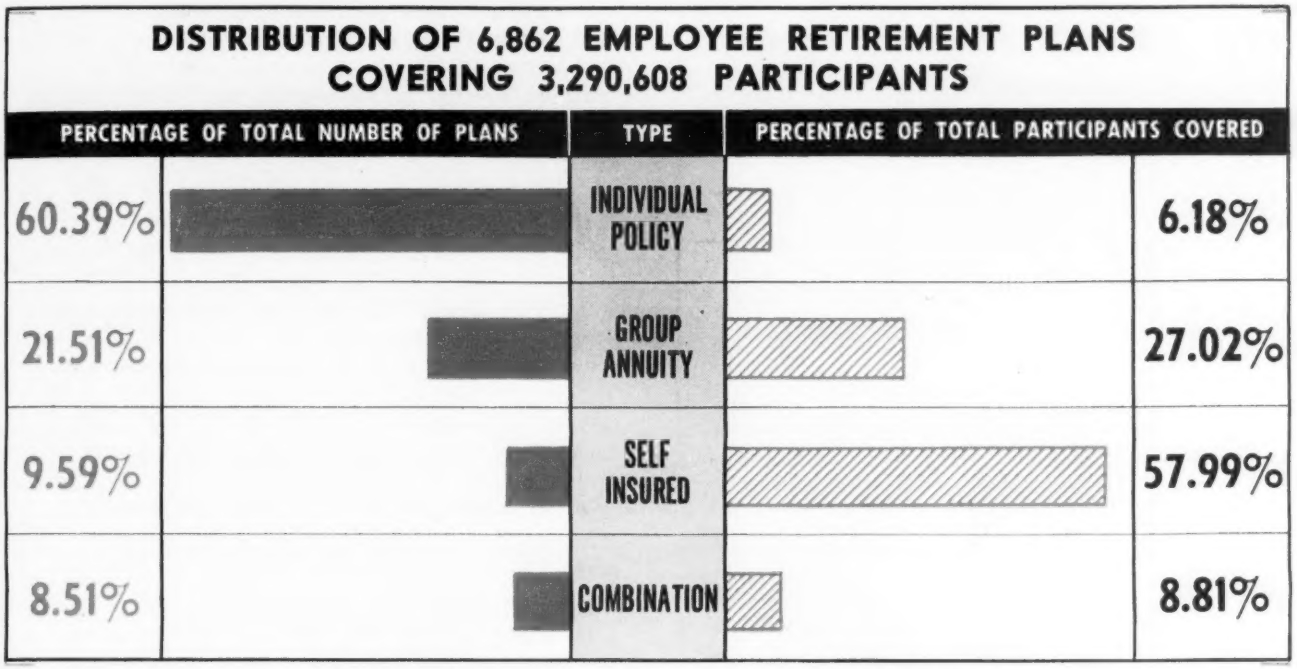
Prepared by Willard A. Weiss, Eugene M. Klein and Associates

Fig. 2—Participants in private company pension plans have tripled since 1930. Figures are from the Bureau of Internal Revenue, adjusted to show trend. Excluded are retirement plans of such groups as municipal, state and federal government employees, school teachers, Railroad Retirement Act, and similar groups

Insured or Uninsured—First major breakdown of types is into insured and uninsured plans.

The insured plans usually use the facilities of a commercial insurance company. Types of insured plans may be described briefly as follows:

1. Individual Policy. The employer makes an annual contribution to a trustee, often a bank, who



Prepared by Willard A. Weiss, Consultant with Eugene M.Klein and Associates

Fig. 3—Average coverage of the individual policy pension trust plan is about 50. Average for group annuity plans is about 600 participants per plan. Trusteed plans have an average of 2900 participants. Figures are adapted from Bureau of Internal Revenue statistical tables

buys an insurance policy for each employee to provide a unit of retirement income at a specified age. Medical examinations usually are required for employees covered. Cost to employer normally is financed on a level basis for each employee. More pension programs have been set up under this plan than any other (see Fig. 3) although the total number of participants covered is relatively small, averaging 50. It often is used to provide pensions for salaried employees above the $3000 class.

2. Group Permanent. This plan involves a master contract between the employer and an insurance company and provides retirement income insurance. No trustee ordinarily is needed. Plan is similar to the individual contract, with group practices. Employer's contribution usually is financed on a level basis with respect to each employee. Minimum of 25 to 50 employees covered usually is required.

3. Group Annuity. This involves a master contract between the company and an insurance carrier generally providing for complete purchase each year of a specified unit of ultimate pension to be provided for employees. Cost of such pension is determined separately with respect to future and past service. Cost of future service benefits depends upon the age of the employee in each particular year. Cost of past service often is determined as a lump sum and payments to amortize the past service cost may be made over a period of 10, 15 or 20 years. Usual minimum is 50 employees and average is 600.

4. Deposit Administration. This is a master contract between the employer and insurance company under which the insurance company agrees to handle the employer's fund on a typical self-funded basis. At retirement, the funds ordinarily are used to purchase single premium annuities. Usually, this plan requires a minimum of 500 to 1000 covered employees.

Uninsured plans usually are described as trusteed, self-funded, self-administered or self-insured. Under this type of plan a trust is created and the employer periodically contributes what is necessary to maintain the plan on an actuarially sound basis. An actuary computes the amount of the contribution required, revising it periodically in keeping with the company's experience. The trustee, usually a bank, receives the contributions, invests the funds, and pays out the benefits. Average number of employees involved in self-funded plans is 2900. As shown in Fig. 3, a majority of participants is covered by this type of plan, although the number of such plans is relatively small.

How Large a Benefit—The unions have injected a new note in pension planning by their demands for a flat pension, generally $100 a month. Practically all pension plans now in effect provide benefits as a percentage of earnings based on length of service. Most of those approved within recent years are integrated with federal social security.

The union wants a flat amount of benefit at retirement age, without relation to amount of earnings or length of service beyond a minimum eligibility requirement. While the flat amount per month has the advantage of being easily understood by the worker, it is doubtful whether higher-paid employees in the long run will be satisfied with a plan that gives no recognition to higher earning power or greater length of service.

Employers generally prefer to have retirement

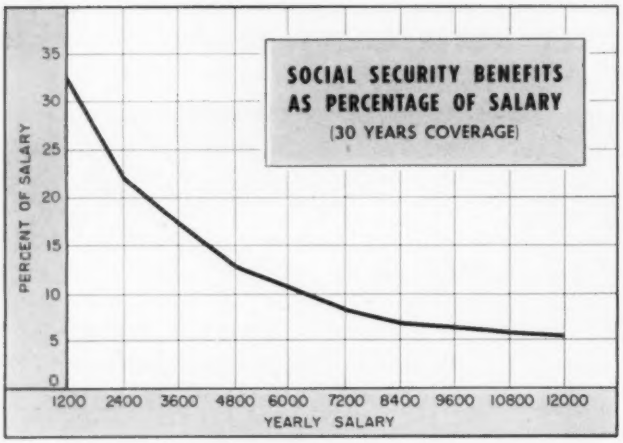


Fig. 4—Social Security benefits become increasingly inadequate as earnings increase. Benefits amount to 32.5 per cent of $1200 annual earnings, are only 3.1 per cent of $20,000 annual earnings

benefits in ratio to employee's earnings and service.

Most pension specialists favor a plan in which benefits represent a percentage of earnings and which are integrated with social security benefits. The minimum average pension, including social security benefits, usually aimed for is 45 per cent of the employee's average earnings during his period of service under the plan. Such benefits, integrated with social security, usually are attainable by this formula:

> *Past service credit*—¾ per cent of present annual earnings for each year of past service.
> *Future service*—¾ per cent of first $3000 of future earnings, plus 1½ per cent of earnings over $3000.

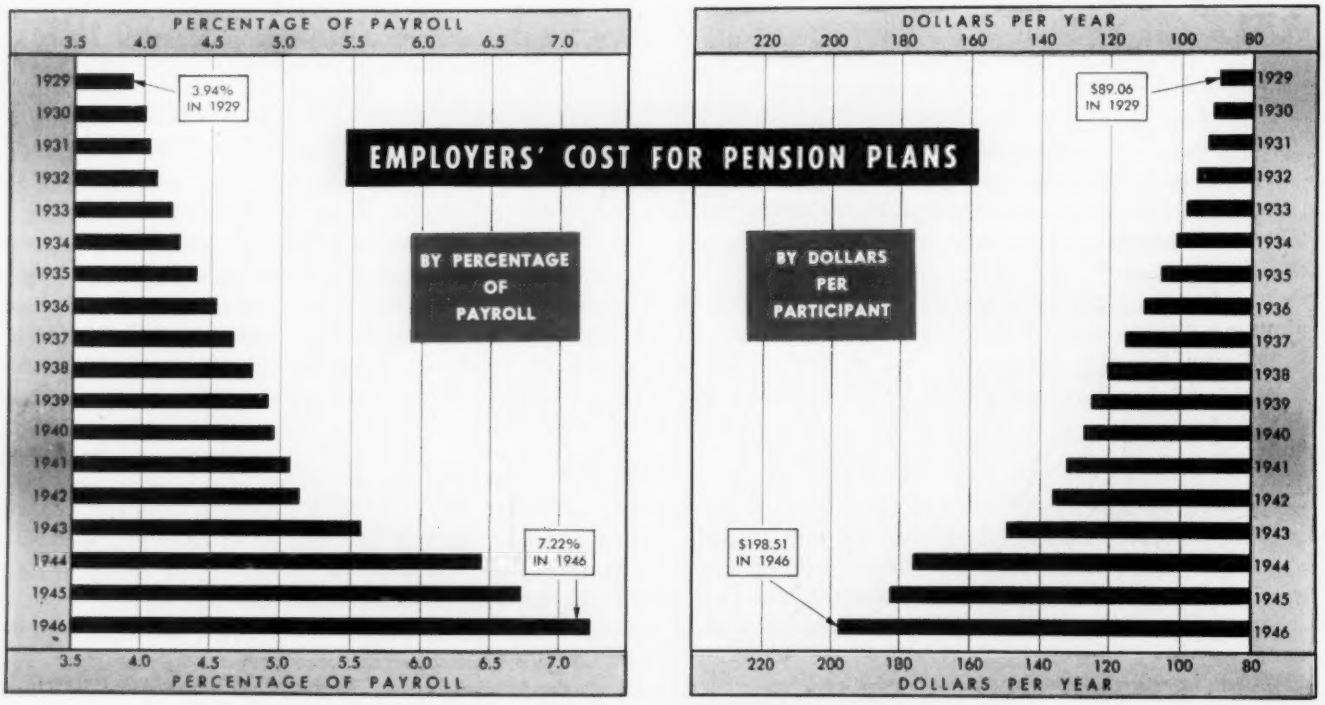
A more generous plan provides for 50 per cent of final pay, including social security, and a compromise plan aims at 50 per cent of average earnings for the five or ten years before retirement.

Limitations of Social Security—At today's living costs, social security benefits are conceded to be inadequate. Average monthly payments run about $30. Social security payments become relatively less important as the salary increases. As shown in Fig. 4, social security benefits, after 30 years' coverage, amount to about 32.5 per cent on a $1200 income, drop to a little more than 20 per cent for $3000 income and are only 5.2 per cent on $12,000 income.

Currently being pushed by the national administration is legislation to extend and liberalize social security. One bill would lift maximum benefits from 61 to 116 per cent to provide a maximum of $150 for married couples. It also would raise maximum contribution from employers and employees from the present $30 annually to $96.

Integrating Benefits—In view of the likelihood that both social security benefits and costs may be increased sharply, many employers will insist that private pension plan benefits be integrated with social security. This will afford a measure of protection against social security costs becoming overly burdensome after a company has adopted an expensive and generous private pension plan.

Should Employees Contribute? Before 1930, more than 70 per cent of all pension plans were on an employer pay-all basis. Between 1930 and 1941, about 60 per cent of plans required some contribution from employees. During the war, the trend was back to



Prepared by Willard A. Weiss, Consultant with Eugene M.Klein and Associates

Fig. 5—Pensions cost to employers has increased from 3.94 per cent of payroll in 1929 to 7.22 per cent of participants' payroll in 1946. Employers' annual average cost for each participant has increased from $89.06 in 1929 to $198.51 in 1946. Figures are adapted from Bureau of Internal Revenue statistics covering all plans approved to August, 1946

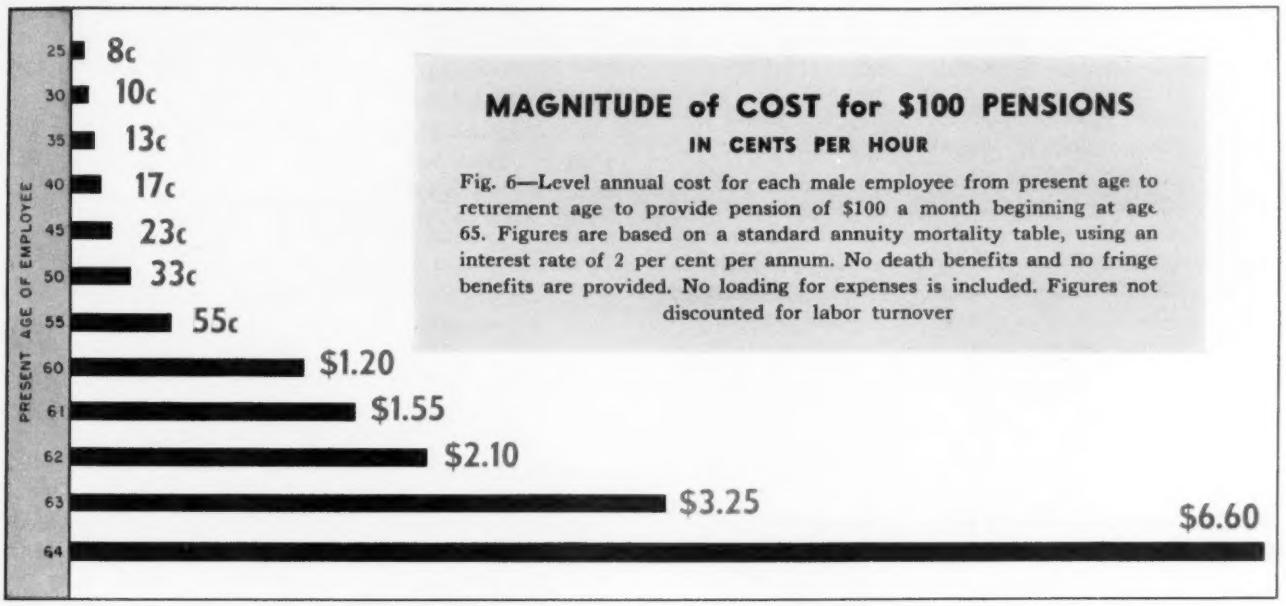


Fig. 6—Level annual cost for each male employee from present age to retirement age to provide pension of $100 a month beginning at age 65. Figures are based on a standard annuity mortality table, using an interest rate of 2 per cent per annum. No death benefits and no fringe benefits are provided. No loading for expenses is included. Figures not discounted for labor turnover

Prepared by Willard A. Weiss, Consultant with Eugene M.Klein and Associates

employer pay-all plans, as such employer contributions were an aid in helping hold or attract labor at a time when wage rates were government-controlled. Since the end of the war, the trend has been tending back to contributory plans.

Many industrial relations men believe it is advisable to require a contribution from the workers. Employee contributions make possible larger benefits. Employees show more interest in a program which they help support. It avoids the charge of paternalism against the employer. Experience generally has shown that a high rate of employee participation can be obtained in a contributory plan.

Advocates of the employer pay-all plan contend that this gives the employer greater freedom in selecting, administering and amending the plan. Participation of all eligible employees is automatic.

How Much Should the Employee Pay? This is governed by the worker's ability to pay and by his willingness. Examination of existing plans show that employee contributions range generally from 2 per cent to 5 per cent of earnings. A fairly common contribution is 2 per cent the first $3000 of annual earnings and 4 per cent of earnings in excess of $3000. Seldom does the employee pay more than a third of the total cost of the program. UAW President Walter Reuther has suggested a 70 per cent contribution by employers, 30 per cent by workers.

Termination Benefits—Vesting provisions in existing pension plans vary widely. Some employers favor no vesting on the ground that this reduces the cost.

Others favor vesting because such a provision makes employees more willing to contribute, increases appreciation of the plan, gives workers a feeling of greater security, fosters good employer-employee relations, can be used to retire impaired or disabled employees before the specified retirement age, and prevents ugly rumors that the employer will discharge old employees before retirement to cut pension costs.

Analysis of pension programs approved by the Bureau of Internal Revenue discloses that 15 per cent of plans have full vesting; 71 per cent have partial vesting; and 14 per cent have no vesting.

Who Is Eligible? Many pension plans require a waiting period before an employee becomes eligible for participation or specifies a minimum age, or both. Purpose is to exclude floaters and persons likely to leave the company. Sometimes a maximum age is set, because of the prohibitively high cost of providing funded pensions for persons near the retirement age, and such persons are handled on an informal basis.

During the war, waiting periods of up to five years were common. This provision was designed to exclude women and others working only during the emergency and who would retire from the labor force when the war ended.

Retirement Age—Usual retirement age in industrial pension plans is 65. This coincides with the retirement age for receipt of social security benefits.

Many plans specify compulsory retirement at the specified age, although exceptions sometimes are granted. CIO President Philip Murray is making a stand for a voluntary retirement at the discretion of the worker in formulating the pension demands for the United Steelworkers.

Many employers prefer a provision for compulsory retirement as this permits the entry and promotion of younger, more vigorous men and generally increases efficiency. Much of the benefit to the employer from a pension plan comes from removal of superannuated workers from the payroll.

Earlier retirement for female workers, often at age 60, is provided in some recent plans. The UAW has suggested 60 as the retirement age in its pension proposal.

Moving retirement age ahead from 65 to 60 will increase the cost for identical benefits by about 50 per cent. Retirement at age 60 also would leave

a gap before total retirement income could be received as social security benefits are not payable until 65.

How Much Will It Cost? This is the most frequently asked question whenever pension plans are mentioned. Unfortunately, there can be no exact answer. Costs will vary widely, depending on the age, earnings and past service of employees, the amount of basic benefits and the fringe benefits (vesting, death benefits before or after retirement, etc.), the method of financing and other factors.

Average costs of pensions in the past, however, are shown in the accompanying charts, prepared by Willard A. Weiss, consultant with Eugene M. Klein & Associates, Cleveland. Fig. 5 shows employers' pension costs as a percentage of payroll for participants and employer's average contribution in dollars per year per employee for all plans approved to 1946.

Fig. 6 illustrates the magnitude of cost of a $100 a month pension at age 65, especially as regards older employees. As a matter of practice, the impact of the high initial cost usually is softened through various actuarial methods.

H. Charles Kwasha, Kwasha & Lipton, New York, in an address before the American Management Association estimated total costs of pensions would range between 10 and 20 cents an hour. He estimates the future service benefits in average amounts will vary from 4 to 12 cents an hour, depending on: 1. Whether the plan is trusteed or insured; and 2. whether the step-rate, level premium or level percentage of payroll funding is used. Cost of past service (10 per cent of the lump sum) will vary from 6 to 11 cents an hour for average benefits.

Trend toward greater longevity will tend to increase pension costs as time goes on. Actuaries estimate that the number of persons 65 and over in the United States will increase from 10 million in 1945 to 18 million in 1960.

Are Pensions Negotiable? The National Labor Relations Board decision that employers must bargain with unions on pensions injected a new element in pension planning. What heretofore has been an extremely complicated task may become doubly so as result of the decision.

Many employers contend flatly that pensions are not negotiable. The subject is so technical that it is difficult enough to reach an accord between company management, attorneys, the Internal Revenue Bureau, the pension consultant, and the insurance company or bank, without bringing union negotiators into the picture. The complications multiply as the number of unions with which a company must bargain increases.

The NLRB and the courts have held, however, that the law requires employers to bargain in good faith with the union. The only relief from this interpretation may rest in Congress. Under present conditions, employers will be well advised to prepare a sound factual basis for negotiation on whatever demands are anticipated from the union, and to send a well-trained team in to bargain with the union negotiators. Such a team might consist of a labor relations man, pension consultant and an attorney.

What Employers Should Do . . .

PENSION specialists' advice to employers who face union demands for pensions and other welfare benefits may be summarized as follows:

1. Forearm yourself with sound factual and actuarial data BEFORE entering into negotiations with the union. This may involve retention of a pension consultant, the gathering and analysis of employees' ages, sex, race, earnings and past service, the determination of benefits to be paid, type of plan best suited to the company, whether the program is to be contributory or noncontributory, and by whom the plan is to be administered. This requires several months. Do not wait until the union makes its demands.

2. Be sure the benefits provided, integrated with social security and other benefits which may be due employees, are adequate to permit retirement at the specified age. If benefits are inadequate, one of the main purposes of the plan—to retire superannuated workers —may be defeated, and the employer will realize no benefit from his expenditure.

3. Avoid deciding on type of plan to be adopted until pension expert has been consulted and data on employees and company position analyzed.

4. Select a plan that provides sufficient flexibility to permit company to meet costs under all probable business conditions.

5. Use care in selecting a pension consultant. Experience, actuarial capacity, knowledge of requirements of Internal Revenue Code, lack of bias in favor of particular plans, availability and ability to provide continuing service are some of the qualifications to look for.

6. Once a plan has been adopted, make sure that employees and their families are adequately informed as to what the plan means to them. Make presentation in simple language that can be grasped by employees and their families easily.

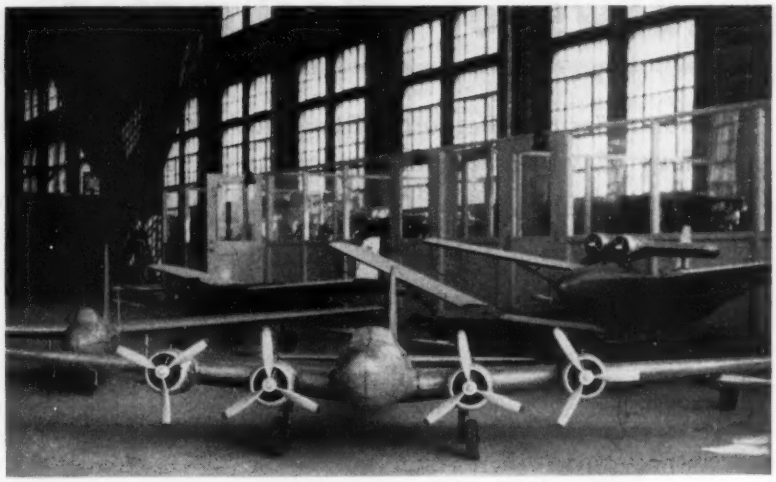
Aircraft Backlogs Soar

Eight producers have orders totaling more than $1.5 billion as rearmament progresses

SOARING order backlogs indicate the aircraft industry is heading for renewed prosperity as the nation's rearmament program gains momentum.

A gigantic backlog of $1,561,400,000 promises profitable operations for eight aircraft producers well into 1950. The eight companies are United Aircraft Corp., East Hartford, Conn.; North American Aviation Inc., Inglewood, Calif.; Douglas Aircraft Co., Santa Monica, Calif.; Lockheed Aircraft Corp., Burbank, Calif.; Grumman Aircraft Engineering Corp., Bethpage, N. Y.; Consolidated Vultee Corp., San Diego, Calif.; Curtiss-Wright Corp., New York; and Republic Aviation Corp., Farmingdale, N. Y.

In 1947 a total of 17,950 planes valued at $444 million were shipped. The government took 38.6 per cent of production by airframe weight. It is estimated that in 1949 the government will take 70 to 80 per cent of the industry's airframe weight production.



FABULOUS MIDGETS: Flying models of aircraft, 7 to 18 feet in length and costing as much as $25,000 to build, provide "stand-ins" for full-scale aircraft in many tests undertaken by the Air Materiel Command at Wright-Patterson Air Force Base, Dayton, O. On a miniature airport, the midgets are put through their paces, and flying data recorded by camera and other means. Some of the models fly at speeds up to 200 mph with conventional reciprocating engines, and plans are underway to operate them at transsonic and supersonic speeds by utilizing rockets and jet engines. Photo shows a B-17 model in foreground. At right is a new twin jet general purpose midget

United Aircraft

UNITED Aircraft's contracts, orders and government letters of intent on Dec. 31, 1948, amounted to about $335 million, compared with $270 million a year earlier.

Sales for 1948 totaled $207,956,522, against $208,263,495 in 1947. About 81 per cent of United's shipments went to the government last year, compared with 69 per cent in 1947. The company's contracts with the government for engineering and development projects are larger now than a year ago. Major production developments in 1948 were the first deliveries from Pratt & Whitney Aircraft Division of the turbo-wasp jet engine and the initial flight testing of the Chance Vought F7U Cutlass plane.

North American Aviation

NORTH American Aviation had unfilled orders as of Mar. 31 of $265.6 million, compared, with $260.5 million a year earlier.

The company had a net income of $2,780,000 for the six months ended Mar. 31, first half of the current fiscal year, compared with $753,438 for the like period a year ago.

Douglas Aircraft

DOUGLAS Aircraft had an order backlog on Nov. 30, 1948, of $232,989,000 an increase of nearly $81 million over the backlog of $152 million at the close of fiscal 1947.

Sales for 1948 were $118,581,847, a drop of nearly $10 million from the previous year's $128,458,597. Company earnings for fiscal 1948 were $5,829,206, compared with a net loss in the previous fiscal year of $2,140,579.

Lockheed Aircraft

LOCKHEED Aircraft had a backlog of $195,901,000 at the end of the year, compared with $139,002,000 a year earlier.

Sales in 1948 were $125,620,700, compared with $135,282,792 in 1947. Net earnings of $6,239,380 in 1948 compare with a loss of $2,471,695 in 1947. About 75 per cent of Lockheed's shipments went to the government last year.

Grumman Aircraft

GRUMMAN Aircraft's unfilled orders at yearend totaled $182 million.

Company's sales for 1948 reached $41,031,000, compared with $24,241,000 in 1947. Its engineering department has designed a successor to the Panther jet fighter, although the older model still is in production. The new plane is being readied for prototype construction.

Consolidated Vultee

CONSOLIDATED Vultee had an unfilled order backlog of $156 million on Nov. 30, 1948.

The company had tremendous losses during fiscal 1948 and 1947, $11,978,795 and $16,721,393, respectively, but is now operating in the black. During fiscal 1948 net sales of $112,351,424 were recorded, compared with $47,442,051 for the preceding fiscal year. About 77 per cent of Consolidated Vultee's shipments went to the government last year.

Curtiss-Wright

CURTISS-Wright had an order backlog on Feb. 28 of $142 million, compared with $127 million on Dec. 31, 1948, and $118.5 million on Dec. 31, 1947.

Company's net sales last year were $111,747,000, compared with $83,162,000 in 1947. Wright Aeronautical Corp., its engine division, had an unfilled order backlog of $41.9 million at yearend, compared with $35,750,000 on Dec. 31, 1947.

Republic Aviation

REPUBLIC Aviation's business on hand totaled $52 million on Mar. 1.

The company reports it is completing orders for about 1000 F-84 Thunderjet fighters. The first of two experimental, high altitude, interceptor fighters, the XF-91, has been completed and will soon be test flown at Muroc Air Force Test Base in California.

a gap before total retirement income could be received as social security benefits are not payable until 65.

How Much Will It Cost? This is the most frequently asked question whenever pension plans are mentioned. Unfortunately, there can be no exact answer. Costs will vary widely, depending on the age, earnings and past service of employees, the amount of basic benefits and the fringe benefits (vesting, death benefits before or after retirement, etc.), the method of financing and other factors.

Average costs of pensions in the past, however, are shown in the accompanying charts, prepared by Willard A. Weiss, consultant with Eugene M. Klein & Associates, Cleveland. Fig. 5 shows employers' pension costs as a percentage of payroll for participants and employer's average contribution in dollars per year per employee for all plans approved to 1946.

Fig. 6 illustrates the magnitude of cost of a $100 a month pension at age 65, especially as regards older employees. As a matter of practice, the impact of the high initial cost usually is softened through various actuarial methods.

H. Charles Kwasha, Kwasha & Lipton, New York, in an address before the American Management Association estimated total costs of pensions would range between 10 and 20 cents an hour. He estimates the future service benefits in average amounts will vary from 4 to 12 cents an hour, depending on: 1. Whether the plan is trusteed or insured; and 2. whether the step-rate, level premium or level percentage of payroll funding is used. Cost of past service (10 per cent of the lump sum) will vary from 6 to 11 cents an hour for average benefits.

Trend toward greater longevity will tend to increase pension costs as time goes on. Actuaries estimate that the number of persons 65 and over in the United States will increase from 10 million in 1945 to 18 million in 1960.

Are Pensions Negotiable? The National Labor Relations Board decision that employers must bargain with unions on pensions injected a new element in pension planning. What heretofore has been an extremely complicated task may become doubly so as result of the decision.

Many employers contend flatly that pensions are not negotiable. The subject is so technical that it is difficult enough to reach an accord between company management, attorneys, the Internal Revenue Bureau, the pension consultant, and the insurance company or bank, without bringing union negotiators into the picture. The complications multiply as the number of unions with which a company must bargain increases.

The NLRB and the courts have held, however, that the law requires employers to bargain in good faith with the union. The only relief from this interpretation may rest in Congress. Under present conditions, employers will be well advised to prepare a sound factual basis for negotiation on whatever demands are anticipated from the union, and to send a well-trained team in to bargain with the union negotiators. Such a team might consist of a labor relations man, pension consultant and an attorney.

What Employers Should Do . . .

PENSION specialists' advice to employers who face union demands for pensions and other welfare benefits may be summarized as follows:

1. Forearm yourself with sound factual and actuarial data BEFORE entering into negotiations with the union. This may involve retention of a pension consultant, the gathering and analysis of employees' ages, sex, race, earnings and past service, the determination of benefits to be paid, type of plan best suited to the company, whether the program is to be contributory or noncontributory, and by whom the plan is to be administered. This requires several months. Do not wait until the union makes its demands.

2. Be sure the benefits provided, integrated with social security and other benefits which may be due employees, are adequate to permit retirement at the specified age. If benefits are inadequate, one of the main purposes of the plan—to retire superannuated workers —may be defeated, and the employer will realize no benefit from his expenditure.

3. Avoid deciding on type of plan to be adopted until pension expert has been consulted and data on employees and company position analyzed.

4. Select a plan that provides sufficient flexibility to permit company to meet costs under all probable business conditions.

5. Use care in selecting a pension consultant. Experience, actuarial capacity, knowledge of requirements of Internal Revenue Code, lack of bias in favor of particular plans, availability and ability to provide continuing service are some of the qualifications to look for.

6. Once a plan has been adopted, make sure that employees and their families are adequately informed as to what the plan means to them. Make presentation in simple language that can be grasped by employees and their families easily.

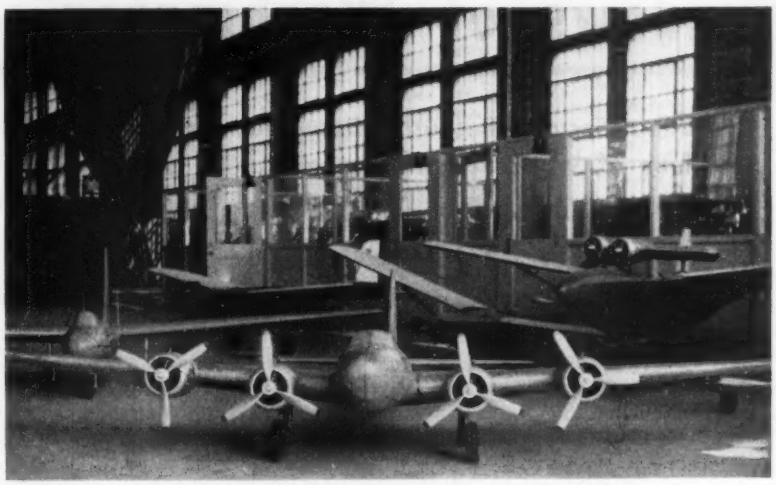
Aircraft Backlogs Soar

Eight producers have orders totaling more than $1.5 billion as rearmament progresses

SOARING order backlogs indicate the aircraft industry is heading for renewed prosperity as the nation's rearmament program gains momentum.

A gigantic backlog of $1,561,400,000 promises profitable operations for eight aircraft producers well into 1950. The eight companies are United Aircraft Corp., East Hartford, Conn.; North American Aviation Inc., Inglewood, Calif.; Douglas Aircraft Co., Santa Monica, Calif.; Lockheed Aircraft Corp., Burbank, Calif.; Grumman Aircraft Engineering Corp., Bethpage, N. Y.; Consolidated Vultee Corp., San Diego, Calif.; Curtiss-Wright Corp., New York; and Republic Aviation Corp., Farmingdale, N. Y.

In 1947 a total of 17,950 planes valued at $444 million were shipped. The government took 38.6 per cent of production by airframe weight. It is estimated that in 1949 the government will take 70 to 80 per cent of the industry's airframe weight production.



FABULOUS MIDGETS: Flying models of aircraft, 7 to 18 feet in length and costing as much as $25,000 to build, provide "stand-ins" for full-scale aircraft in many tests undertaken by the Air Materiel Command at Wright-Patterson Air Force Base, Dayton, O. On a miniature airport, the midgets are put through their paces, and flying data recorded by camera and other means. Some of the models fly at speeds up to 200 mph with conventional reciprocating engines, and plans are underway to operate them at transsonic and supersonic speeds by utilizing rockets and jet engines. Photo shows a B-17 model in foreground. At right is a new twin jet general purpose midget

United Aircraft

UNITED Aircraft's contracts, orders and government letters of intent on Dec. 31, 1948, amounted to about $335 million, compared with $270 million a year earlier.

Sales for 1948 totaled $207,956,522, against $208,263,495 in 1947. About 81 per cent of United's shipments went to the government last year, compared with 69 per cent in 1947. The company's contracts with the government for engineering and development projects are larger now than a year ago. Major production developments in 1948 were the first deliveries from Pratt & Whitney Aircraft Division of the turbo-wasp jet engine and the initial flight testing of the Chance Vought F7U Cutlass plane.

North American Aviation

NORTH American Aviation had unfilled orders as of Mar. 31 of $265.6 million, compared, with $260.5 million a year earlier.

The company had a net income of $2,780,000 for the six months ended Mar. 31, first half of the current fiscal year, compared with $753,438 for the like period a year ago.

Douglas Aircraft

DOUGLAS Aircraft had an order backlog on Nov. 30, 1948, of $232,989,000 an increase of nearly $81 million over the backlog of $152 million at the close of fiscal 1947.

Sales for 1948 were $118,581,847, a drop of nearly $10 million from the previous year's $128,458,597. Company earnings for fiscal 1948 were $5,829,206, compared with a net loss in the previous fiscal year of $2,140,579.

Lockheed Aircraft

LOCKHEED Aircraft had a backlog of $195,901,000 at the end of the year, compared with $139,002,000 a year earlier.

Sales in 1948 were $125,620,700, compared with $135,282,792 in 1947. Net earnings of $6,239,380 in 1948 compare with a loss of $2,471,695 in 1947. About 75 per cent of Lockheed's shipments went to the government last year.

Grumman Aircraft

GRUMMAN Aircraft's unfilled orders at yearend totaled $182 million.

Company's sales for 1948 reached $41,031,000, compared with $24,241,000 in 1947. Its engineering department has designed a successor to the Panther jet fighter, although the older model still is in production. The new plane is being readied for prototype construction.

Consolidated Vultee

CONSOLIDATED Vultee had an unfilled order backlog of $156 million on Nov. 30, 1948.

The company had tremendous losses during fiscal 1948 and 1947, $11,978,795 and $16,721,393, respectively, but is now operating in the black. During fiscal 1948 net sales of $112,351,424 were recorded, compared with $47,442,051 for the preceding fiscal year. About 77 per cent of Consolidated Vultee's shipments went to the government last year.

Curtiss-Wright

CURTISS-Wright had an order backlog on Feb. 28 of $142 million, compared with $127 million on Dec. 31, 1948, and $118.5 million on Dec. 31, 1947.

Company's net sales last year were $111,747,000, compared with $83,162,000 in 1947. Wright Aeronautical Corp., its engine division, had an unfilled order backlog of $41.9 million at yearend, compared with $35,750,000 on Dec. 31, 1947.

Republic Aviation

REPUBLIC Aviation's business on hand totaled $52 million on Mar. 1.

The company reports it is completing orders for about 1000 F-84 Thunderjet fighters. The first of two experimental, high altitude, interceptor fighters, the XF-91, has been completed and will soon be test flown at Muroc Air Force Test Base in California.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

National Security Resources Board lacks authority to build nucleus of war-emergency organization. Some able men leaving agency because of stalemate. White House blamed

RECENT history of the National Security Resources Board is a cause for considerable concern to industrialists. Under the present setup, this agency appears not to be creating the nucleus for any large-scale industrial mobilization organization that may be necessary for a future war emergency. Blame for the situation generally is placed squarely on the White House doorstep.

Although refusal of the Senate to confirm Mon C. Wallgren as chairman of the NSRB was pretty much of a political affair, business interests are glad that the matter turned out as it did. Mr. Wallgren, as a retail jeweler and optometrist, in addition to his service as representative and senator from Washington, has no industrial background and could not qualify as a man intimately acquainted with the country's industry.

However, the Wallgren episode is only one instance of poor handling of the NSRB.

Wanted Standby Powers—When Arthur M. Hill resigned as chairman, no disclosure was made of the circumstances underlying his action. The story appears to be about as follows: Hill's organization prepared complete plans for industrial mobilization, and contended that in order to do that effectively it would have to be given necessary standby powers by Congress—powers to issue the various orders necessary in time of war to permit effective operation of industry and the most effective use of strategic and critical materials. In other words, Mr. Hill asked for authority to create, immediately, the nucleus of a super-organization that in another war would carry out the functions of the War Production Board, Office of Price Administration, etc., in World War II.

Men "in the know" recognize that there were two sides to the resulting controversy. For at least one of the objections to the Hill program there appears to be some justification; several cabinet members feared that authorization of the Hill proposals might lead to military control of industrial mobilization and materials utilization—and they did not want that. There were many other objections. Commerce, for example, wanted to hang on to the voluntary allocations agreement function; Interior wanted top authority in the field of minerals, Agriculture in the field of soil utilization, etc.

From this wrangle, President Truman found no quick way out. He appointed his assistant, John R. Steelman, as acting chairman of NSRB. Then, with the purpose of insuring full civilian control of the vital chore of industrial moblization, he sent in the ill-fated nomination of Mr. Wallgren. Now the interim responsibility is back in the hands of Mr. Steelman.

Lacks Power—Lacking authority to do a job which it regards as logical and essential, the NSRB these days is going through motions. It has many fine plans and blueprints, but can do nothing to make them come to life—and there is no other government agency with power to do this important organizational job. The NSRB has lost some of its best men of late, who just got tired of sitting in a stalemate. If the present situation continues long, the NSRB will really start to fall apart. Not the least challenging aspect of the situation is that some of the good men who have left have been replaced with others whose training scarcely qualifies them.

What industry can do to improve this bad situation is not clear. Only action at the White House can be effective. Nevertheless the matter is of intense importance to industry—for it should be clear that industrial mobilization can be achieved only with the help of industry, by placing industrialists in top positions, and by clothing them with authority. Possibly the best opportunity to get industry's needs understood in high places will come in the hearings of the two committees concerned with the President's request for standby economic controls. These are the Senate and House Banking and Currency Committees.

FTC Without Chairman

AS A result of White House delay, the Federal Trade Commission is limping along without a chairman and with only three members who are sure of their jobs. No successor to Republican Robert E. Freer, who left the commission Dec. 31, has been nominated, nor has there been a change in the status of Democratic Garland S. Ferguson whose confirmation for another term was not acted on by the Senate in 1948; Mr. Ferguson continues to serve on an interim basis under the statute which provides that when a commissioner's term expires he may continue in office until his successor has been nominated and confirmed.

In line for the 1949 chairmanship, under the rotational arrangement, is Republican Lowell B. Mason, but the majority of commissioners decided in January to defer election until such time as the full commission (five members) can act. Whether the fact that Mr. Mason on numerous occasions has rebuked his fellow commissioners for their policies in enforcing the Federal Trade Commission and Clayton Acts had anything to do with this postponement has not been stated.

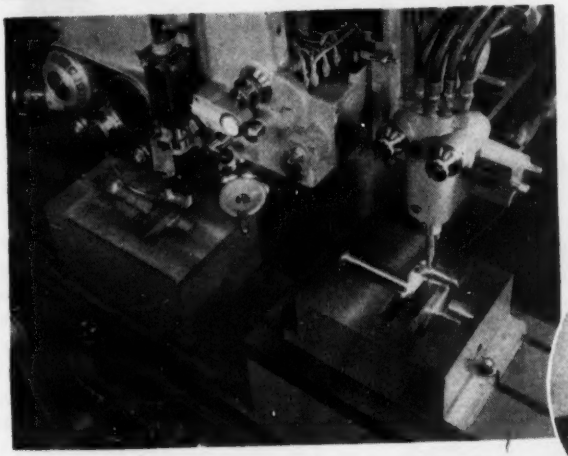
Steel Study Under Way

NOW under way in the Commerce Department, with the assistance of spokesmen from other interested agencies, is a study which may have considerable bearing on what the administration later on may recommend as necessary expansion of steelmaking facilities. The study is aimed at determining, first, the size of steel needs under varying future conditions and, second, the relationship of existing and anticipated capacity to those needs. This, of course, is a pretty tall order, especially now that nobody has any idea as to how much of an increase in steel demand will come about as a result of the new North Atlantic security pact.

Urges New Safety Campaigns

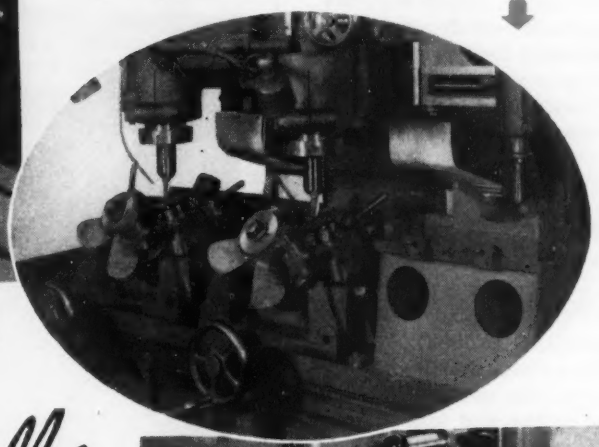
WHILE the occurrence of industrial accidents is less frequent than in past years, too many workers lose their lives or sustain injuries from this cause, President Truman told his Conference on Industrial Safety, held in Washington, Mar. 23-24. Work injuries in 1947 cost United States employers $3,131,000,000, of which more than $600 million was workman's compensation, and hospital and medical payments; 1948 figures are not yet available. Floor discussion brought out an accusation from a labor source that the steel industry and other heavy industries have failed to develop adequate safety codes.

The goal, as put before the con-



CINCINNATI Diesinking Machines may be employed in many ways. Here, a single throw crankshaft die is being faithfully copied from a master. CINCINNATI 16" Vertical Hydro-Tel Milling Machine. Catalog M-1497.

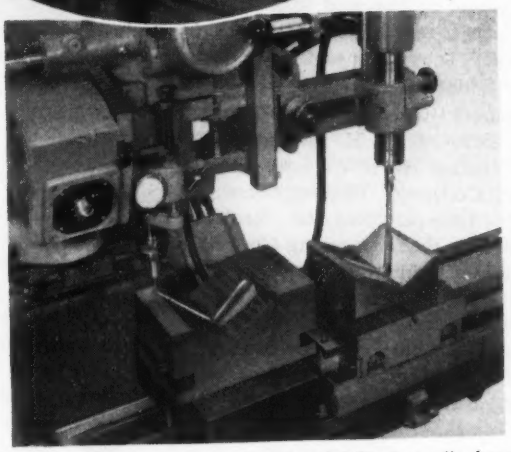
You can assign production milling work to CINCINNATI Diesinking Machines. In the illustration below, complex contours of propeller blades are followed faithfully by the tracer finger on this CINCINNATI 28" Vertical Hydro-Tel Milling Machine. Catalog M-1284-2.



Yours faithfully

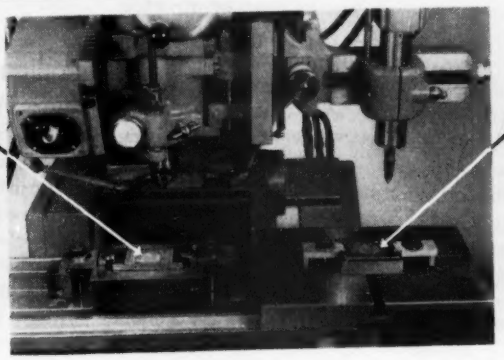
CINCINNATI DIESINKING MACHINES

Parts made from dies and molds can't economically be exactly like the original. But they will bear an accurate likeness to the original if the dies and molds are made on CINCINNATI Diesinking Machines. Costs will be lower, too, for these machines greatly reduce the time required for hand finishing. You can learn more about CINCINNATI Tool and Die Milling Machines by writing for the literature mentioned in captions.



Copycat in reverse. Excellent fidelity in a die for a left-hand golf club head is obtained from a right-hand master. Equipment consists of a CINCINNATI 8" x 18" Tool and Die Miller, equipped with a right- and left-hand attachment.

DIE



MASTER

Left: Faithful reproduction is essential in milling an ornamental Indian head die. The die has not been hand-tooled nor the photograph retouched. The machine is a CINCINNATI 8" x 18" Tool and Die Milling Machine. Catalog M-1620.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES
FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

ference by the President, is to cut the current 2,000,000 job-accidents a year in half over the next three years. James E. Trainer, vice president and production manager, Firestone Tire & Rubber Co., as chairman of the Committee on the Engineering Approach to Industrial Safety, urged that the Labor Department, with the state labor departments, analyze the shortcomings of existing state laws and codes and develop a program for legislation that will prove more adequate.

Navy Studies X-Ray Techniques

LATEST in the Navy's series of symposiums for the discussion of new or improved technological techniques was held at Naval Ordnance Laboratory at White Oak, Md., Mar. 24-25. Devoted to the use of x-rays in nondestructive testing and inspection of metal objects, it was attended by some 350 scientists and representatives of industry.

Speakers included the following from industry: E. E. Charlton, General Electric Research Laboratories; J. W. Coltman, Westinghouse Research Laboratories; D. Robinson, High Voltage Engineering Co.; R. O. Flemming, Ballistic Research Laboratories; C. M. Slack, Westinghouse Electric Corp.; C. W. Briggs, Steel Founders Society of America; K. R. Van Horn, Aluminum Co. of America; O. R. Carpenter, Babcock & Wilcox Co.; J. C. McDonald, Dow Chemical Co.

Navy men who discussed Navy use of x-ray equipment were L. W. Ball, J. J. Pierce and T. K. Chatham, Naval Ordnance Laboratory; N. E. Promisel, Bureau of Aeronautics, and R. H. Lambert, Bureau of Ships. H. H. Lester, Watertown Arsenal, spoke for the Army Ordnance Department on use of nondestructive testing, and J. C. McGee was spokesman for the Air Force.

A brochure containing the technical addresses will be prepared shortly by the Navy and copies made available to those interested.

Use of the laboratory's 10,000,000-volt betatron, developed by the General Electric Consulting and Engineering Laboratory, Schenectady, N. Y., which penetrates up to 16 inches of steel, was demonstrated, along with smaller equipment.

Child Labor Laws Violated

VIOLATIONS of the child-labor laws continue surprisingly numerous despite years of enforcement. The 1948 annual report of the administrator of the Wage and Hour and Public Contracts Divisions reports 4628 boys and girls were illegally employed in that year and that violations were disclosed in 1384 of the 28,998 establishments inspected. Violations were found in "every major industry group," according to the report, but by far the most were in canneries, saw mills, and laundries and dry cleaning plants.

BRIDGE FOR MANILA: An entire 350-foot steel bridge for the Pasig river in Manila, to replace the Quezon bridge destroyed during the war, is being shipped from San Francisco. The 1200-ton span, built by Moore Dry Dock Co., will be shipped in 2000 sections. Photo shows part of the bridge being loaded on ship. NEA photo

Boyd Gets Pay Checks

AFTER numerous disappointments, James Boyd on Mar. 24 was sworn into the job he has been occupying on an interim basis—that of director of the Bureau of Mines. The big moment came when Interior Secretary Krug handed him checks for $10,847.83 in back pay. It took John L. Lewis' 2-weeks' coal mine walkout to get the Senate to confirm the long-standing Boyd nomination; the senators were not taking any intimidation from Mr. Lewis. Australian-born, Mr. Boyd is a former United States Army officer and former dean of the Colorado School of Mines.

Plans Big Press Purchase

THE GOVERNMENT is contemplating purchase of three 60,000-ton hydraulic presses for cold forging of aircraft parts. These presses, which will be the largest in the world, were described in STEEL, Dec. 13, p. 112. The Germans had a 30,000 ton press used in the forging of propellers, and Wyman-Gordon Co., Worcester, Mass., has one rated at 18,000 tons.

May List Banned Exports

DISCUSSION about whether or not to publish a list of the commodities which may not be shipped to Iron Curtain countries has been revived in the Office of International Trade. If a favorable decision is reached—and there is no assurance as yet that the decision will be favorable—the list would be made public before the end of April.

Indian Power Project Planned

WESTINGHOUSE Electric International Co. has entered into an agreement with the government of the East Punjab province in India for design and equipment of a 110,000-kva hydro-electric power project on the Sutlej river according to anouncement by William E. Knox, president. Equipment for the project, largest undertaken since the new Indian government was formed, will cost approximately $9 million.

Equipment for the Nangal power project will take approximately three years to manufacture with Nangal I apparatus scheduled for shipment in two years. Westinghouse will provide key engineering personnel to supervise erection of the equipment on the site.

Reds' Steel Output Up?

German steel experts estimate Eastern European production at 33 million net tons in 1948

EASTERN Europe, consisting of Russia, Finland, Yugoslavia, Roumania, Poland, Hungary, Czechoslovakia and Eastern Germany, produced 33 million net tons of steel ingots and castings in 1948, compared with 29 million tons in 1947 and 24.8 million tons in 1938, German steel experts estimate. Various British and American sources have placed Eastern European output in 1948 at about 26 million net tons and that of Western Europe at approximately 43.8 million tons.

The German Steel Association in its "Statistical Abstract for the Iron & Steel Industry, 1948," published in Dusseldorf in the British Zone, estimates Russian steel ingot and casting output at 26.4 million tons last year, compared with 24.2 million tons in 1947. Poland's steel production in 1947 is set at 1.7 million tons, and for 1948 it is figured as being "considerably higher." Czechoslovakia turned out 2,530,000 tons in 1947, says the report, and about 3,080,000 tons in 1948.

Reports are also current that the Soviets are working to boost the steel capacity of Upper Silesia in Eastern Germany to 11 million tons annually. This would compare with a capacity of 8,250,000 tons now available in the Ruhr. Coal mining capacity in Upper Silesia would be raised to 132 million tons annually. The Ruhr's potential is about 98 million tons.

Great Britain

ALTHOUGH Great Britain produced a record 16.6 million net tons of steel ingots and castings in 1948, this output is still insufficient, the Chancellor of the Exchequer points out in his Economic Survey for 1949, an annual summary of United Kingdom prospects.

By 1953-54, Britain will need 20.1 million net tons of ingots and castings annually, and the outlook is that these requirements can be met through domestic production of 19.6 million tons and importations of the rest. During 1949, however, the imbalance between supply and demand is expected to be as severe as ever because shortages of coke, ore and scrap will limit production from new blast and steel furnaces which are coming into operation this year. The most optimistic estimates place British steel production at 17.4 million tons this year, to be supplemented by imports of 1.1 million net tons. About 450,000 tons were imported in 1948.

The Economic Survey reports that electrical output is another major problem which threatens British economic recovery. Total consumption has nearly doubled since the war while generating capacity is up only 33 per cent from 1938-39.

Last year 232.5 million net tons of coal were mined, 12.3 million tons more than in 1947. For 1949, production of about 243 million tons is forecast.

The survey indicates that national income in terms of money rose 10 per cent from 1947 to 1948, but that there was a substantial real rise also, in spite of inflation.

France

FRENCH economic situation continues to be as favorable as it has been since the war. December unemployment remained slight, and there were 700 business failures in the last three months of 1948, which is considered a reasonably low figure.

France and the Saar produced an average of 61 million tons of coal per year from 1934-1938, but 62 million tons were dug last year in spite of the strike, and 75 million tons are expected to be mined yearly by 1952-53. About 8.6 million tons of steel was made last year, compared with an average of 8.8 million per year from 1934 to 1938 and the projected output of 14 million tons by 1952-53.

About 67,000 tons of aluminum were produced last year, compared with an average of 48,000 tons per year from 1934 to 1938 and the projected output of 103,000 tons by 1952-53. More than 28 billion kwh of electricity were generated in France last year, compared with an average of 19 billion per year from 1934 to 1938 and the projected output of 40 billion by 1952-53.

The power generating program, however, has received a blow from a severe fire at the Genissiat hydraulic power plant near the Franco-Swiss border. It will be two months before the plant can resume operations.

Will Discuss Machinability

SYMPOSIUM on machinability will be held at Purdue University, Lafayette, Ind., on Apr. 23, under sponsorship of the university's chapter of American Society for Metals. Purpose of the symposium is to discuss problems in machining operations in manufacturing and to familiarize those attending with recent developments in machining.

Dr. Arthur F. Focke, Diamond Chain Co., Indianapolis, will serve as chairman of the technical sessions. Dr. M. Eugene Merchant of Cincinnati Milling Machine Co., Cincinnati, will speak on "The Fundamentals of Machinability" and C. E. Sims of Battelle Memorial Institute, Columbus, O., will discuss "Recent Developments in Machinability." A. W. Lindert of Standard Oil Research Laboratories will present "Recent Developments in Cutting Oils."

Calendar of Meetings

Apr. 4-6, National Sanitary Supply Association: First institute of sanitation and modern cleaning methods, Hotel Sherman, Chicago. Press headquarters for the association are at 220 S. State St., Chicago.

Apr. 5-6, Metal Powder Association: Fifth annual meeting and exhibit. Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

Apr. 5-7, American Gas Association: Sales conference on industrial and commercial gas, Andrew Jackson Hotel, Nashville, Tenn. Association headquarters are at 420 Lexington Ave., New York.

Apr. 6, Detroit Chapter of American Foundrymen's Society: Congress of foundry experience, Rackham Memorial Bldg., Detroit.

Apr. 10-17, General Motors Corp.: Transportation show, Convention Hall, Detroit.

Apr. 11-12, American Machine Tool Distributors Association: Meeting, Hotel Oglethorpe, Savannah, Ga.

Apr. 11-12, American Zinc Institute: 31st annual meeting, Hotel Statler, St. Louis. Institute's Galvanizers Committee will meet concurrently with the general convention. Institute headquarters are at 60 E. 42nd St., New York.

Apr. 11-12, American Institute of Electrical Engineers: Conference on industrial application of electron tubes, Hotel Statler, Buffalo. Institute headquarters are at 33 W. 39th St., New York.

Apr. 11-13, American Society of Lubrication Engineers: Annual convention, Hotel Statler, New York. Lubrication show will run concurrently with the convention.

Apr. 11-14, National Association of Corrosion Engineers: Fifth annual conference and exhibition, Netherland-Plaza Hotel, Cincinnati. Association headquarters are at 905 Southern Standard Bldg., Houston.

Apr. 11-14, Society of Automotive Engineers: Aeronautic and air transport meeting and aircraft engineering display, Hotel New Yorker, New York. Society headquarters are at 29 W. 39th St., New York.

Apr. 11-15, American Society for Metals: Western metal congress and exposition, Shrine Civic Auditorium, Los Angeles. Society headquarters are at 7301 Euclid Ave., Cleveland.

Apr. 12-13, American Management Association: Production conference, Waldorf-Astoria Hotel, New York. Association headquarters are at 330 W. 42nd St., New York.

Apr. 18-20, Open Hearth Steel Committee and Blast Furnace, Coke Oven and Raw Materials Committee, Iron & Steel Div., AIME: Thirty-second annual conference, Palmer House, Chicago. Institute headquarters are at 29 W. 39th St., New York.

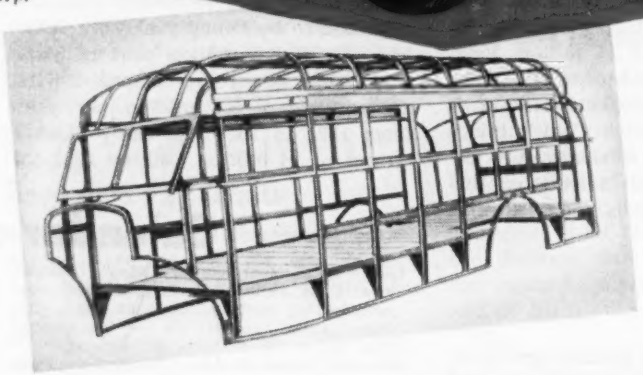
Apr. 18-20, Illinois Institute of Technology: Eleventh annual Midwest power conference, Sherman Hotel, Chicago. Conference is also sponsored by many other institutions.

Apr. 19-20, Magnesium Association: Annual spring meeting and product exhibit, Edgewater Beach Hotel, Chicago.

Apr. 19-21, American Institute of Electrical Engineers: Southwest district meeting, Baker Hotel, Dallas.

FRAMED and COVERED with safety

Pictures courtesy of Oneida Products Corp.



The greater strength and toughness of N-A-X HIGH-TENSILE steel permits weight savings of up to 25% in section—and still affords maximum protection against injuries from traffic accidents.

Its superior fatigue-resistance and excellent weldability prolongs this safety-factor . . . reduces maintenance costs over more miles and under all conditions.

If you manufacture a product requiring high strength, toughness and good weldability, it will pay you to investigate N-A-X HIGH-TENSILE.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division • Detroit 18, Michigan
UNIT OF NATIONAL STEEL CORPORATION

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Kaiser-Frazer cuts prices sharply in bid for larger share of automotive market. Edgar Kaiser becomes president, with Joseph Frazer taking office of vice chairman

DETROIT

MORE cracks are developing in the automobile price wall—surprising many who had thought the first important reductions would come from dealers in the form of higher allowances for used cars and not in manufacturers' list prices. General Motors perhaps touched off the trend with its price shaving—less than 1 per cent—late in February. Kaiser-Frazer last week took the axe to its quotations, cutting all models except the new Kaiser Traveler from $198 to $333, or up to 14 per cent. Meanwhile, Henry Ford II hinted publicly some price adjustments this spring are "possible" in view of slightly lowered material costs. And when the BLS consumer price index for Apr. 15 is released late in May, if it should call for another downward revision of General Motors wage rates, another cut in GM prices, on the order of the February change, is practically a foregone conclusion, if only for the public relations value of such a policy.

Major readjustments in executive personnel of Kaiser-Frazer accompanied announcement of the new prices, developing from a series of directors' meetings held in New York over the past three weeks. They confirm a growing cleavage between the Kaiser and Frazer groups in the company. Joseph W. Frazer, former president, reportedly was ready to throw in the chips at one stage, offering to sell his stock holdings for a mere $25 per share (current market $6.50) to the Kaiser group.

Edgar Kaiser Becomes President—However, he ultimately decided differently and now becomes vice chairman of the board, succeeded as president by Edgar F. Kaiser, hitherto vice president and general manager. W. A. MacDonald and O. B. Motter, both Frazer men who have been K-F directors, are now relieved of these posts and no successors named.

Just what the responsibilities of a board vice chairman might be are not immediately disclosed, although Mr. Frazer has closed his suite of offices in New York, dismissed his staff. Just where he will maintain new headquarters is not clear, but spokesmen at Willow Run say he will not be located there. Through Graham-Paige Motors he owns or at least controls 500,000 shares out of a total of 4,750,000 shares of K-F stock—a tidy chunk—which should entitle him to a prominent, if only consultant voice in direction of the company.

Economy Emphasized — Economy has become the watchword at K-F. Appreciable savings have been realized in steel costs by the establishment of new sources, although they would still appear to involve commitments which place the steel bill higher than if material were purchased exclusively from regular mill sources. Slashes in administrative overhead are imminent, an $80,000 per month telephone bill at the Willow Run plant being one item to come under intensive scrutiny.

Field stocks of cars in the hands of dealers are placed by the company at 19,000, or an average of a little over four per dealer. This figure is well under the total which some of K-F's detractors would have you believe. The latter were circulating lengthy telegrams last week to city editors of the nation's newspapers, sketching a bleak outlook for the company in the light of the latest turn of events.

Assembly lines have been operating under reduced draft for the past three weeks, turning out approximately 1400 cars in five days. Accelerated schedules are expected this week and the hope is that the hefty price reductions plus the advent of spring weather will rejuvenate the sales picture. Watching closely will be the Bank of America which holds a $20 million note signed by the Kaisers, with Willow Run assets pledged against it.

GM Making 7500 Daily—Any way you look at it, General Motors Divisions at the moment are running away with the market. Suppliers are being pressed to step up production schedules and shipments. Field stocks of cars, only a fraction of what they have been at this time of year in 1939-41, are diminishing. Passenger cars currently are rolling from lines at close to 7500 per day, along with better than 2000 trucks, which is 41.5 per cent of the total United States output. The corporation prewar enjoyed as high as 45 per cent of the total and appears bending effort to regain or surpass that position.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March		519,154
April		462,323
May		359,996
June		454,401
July		489,736
August		478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos		5,549,323

Estimate for week ended:

	1949	(Same week) 1948
Mar. 12	114,223	114,689
Mar. 19	120,741	115,556
Mar. 26	119,339	107,284
April 2	117,000	105,132

Ward's Automotive Reports

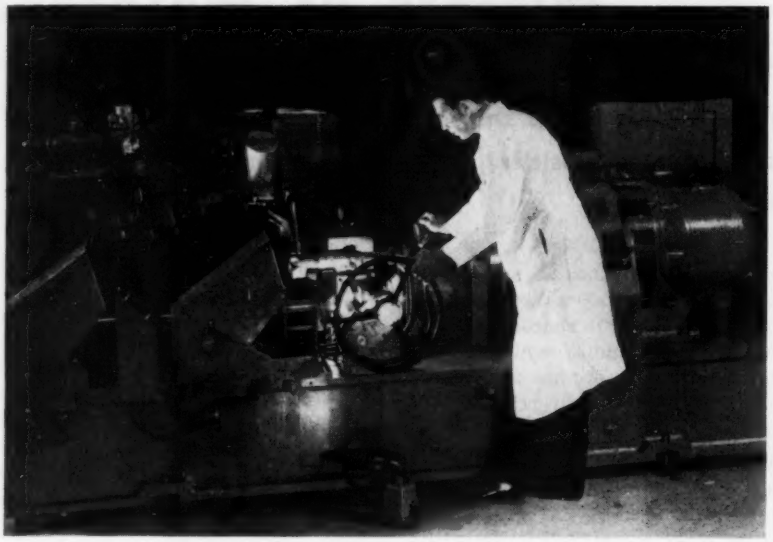
"Transportation Unlimited"

NEXT week GM will unveil its "transportation unlimited" show for Detroit area visitors, on a scale far beyond what was shown in January in New York. More than 50 mechanized exhibits, along with 55 of the 1949 model cars will be on display, covering four times the floor space used in the eastern show.

Among novelties will be the latest and most improved model of an engine assembly balancer, designed and built by GM research laboratories. It is patterned on earlier types which became a part of Buick engine production ten years ago. The machine functions on a production line after rotating parts of the engine have been balanced individually. It is designed to check unbalance resulting from possible "stacking" in a single direction or any other off-center condition that may develop during assembly of components.

Light Rays Note Vibration—The

(Material in this department is protected by copyright and its use in any form without permission is prohibited)



ENGINE BALANCER: General Motors Research Laboratories will demonstrate how an entire motor car engine is balanced dynamically with this machine, at its show, "Transportation Unlimited," in Detroit's Convention Hall Apr. 10-17. An operator will show how unbalance can be removed from an engine by drilling holes near the rim of the flywheel to eliminate off-center weight that otherwise would cause vibration

entire engine, either with or without automatic transmission, is placed in a cradle delicately suspended with metal reeds. A shaft from a 20-horsepower motor on the balancing machine drives the engine during the test cycle, reaching speeds up to 1800 rpm. Vibration is picked up by light ray indicators, determining the amount and angle of unbalance. When the run is stopped, an "inching" button is actuated to turn a calibrated indexing wheel on the shaft linked with the engine and to move the flywheel slowly to the angle of unbalance. Holes are drilled near the rim of the flywheel by a drilling head attached to the machine.

All engines in GM cars and trucks have harmonic balancers at the forward end of the crankshaft and only rarely is one of these detected out of balance by the light ray indicator. When this occurs, a new harmonic balancer is installed, thus correction of overall balance involves only the engine flywheel. The fact that balance is checked at the front end of the engine assembly balancer, however, insures dynamic balance of the complete assembly before installation. The entire operation can be completed in a few minutes and controlled within 3/8-inch-ounce in assembly balance.

Fisher Plant Awarded

CONTRACT for the new Fisher Body fabricating plant near Pittsburgh has been awarded to Ragnar-Benson Inc., Chicago, and work will start on construction soon. Site of the plant is a 68-acre tract directly across from the Irvin Works of Carnegie-Illinois Steel Corp. Grading has been completed, pilings and footings were started last week. The main building will measure 720 x 830 feet, providing more than 725,000 sq ft of floor space. Pits for the lower portion of heavy stamping presses, some measuring four stories in height, will occupy 85,000 sq ft and will be the only parts of the installation below main floor elevation. Two spurs will bracket the building, one with 14-car capacity, the other 20, for outgoing materials.

Construction schedule calls for a start on steel erection by June 15, die tryouts by November and full operation by April of next year. Renovation of a new blanking plant at Ambridge, Pa., is nearly complete and production should start this week.

Quick Changeover

INCIDENTALLY, the changeover to 1949 models was effected by Fisher Body fabricating and assembly plants in the shortest time on record. For fabricating plants, it was the most extensive change since the early 1930s, yet six of them accomplished the job without closing for a single day, involving an overlapping of 1948 and 1949 production never before attempted. At one stamping plant, for example, the normal number of dies in regular use on 1948 production was nearly 1400 and to run 1949 parts concurrently it was necessary to have better than 2500 dies in the plant. On occasion, die changes were made on every press of a major line on a single shift. Average shutdown time for all assembly plants was about seven days, as compared with two to six weeks prior to the war. At two of these units, 1949 bodies were in production before the last of the 1948s were run out.

Ford Resumes Coach Output

PRODUCTION of Ford Motor coaches, interrupted since last November, is being resumed, as the result of settlement of a labor dispute in the plant of Wayne Works Inc., Richmond, Ind., body builder. The coaches are in the 27-29 passenger class, powered with a 6-cylinder engine having 254 cu in. displacement and developing 104 hp. From 1943 through 1946 Ford buses represented between 25 and 40 per cent of total bus output in the country. National distribution of new Ford coaches is being handled by Metropolitan Motor Coaches Inc., under the direction of aggressive William B. Livingston, formerly a top official at General Motors Truck & Coach in Pontiac, Mich.

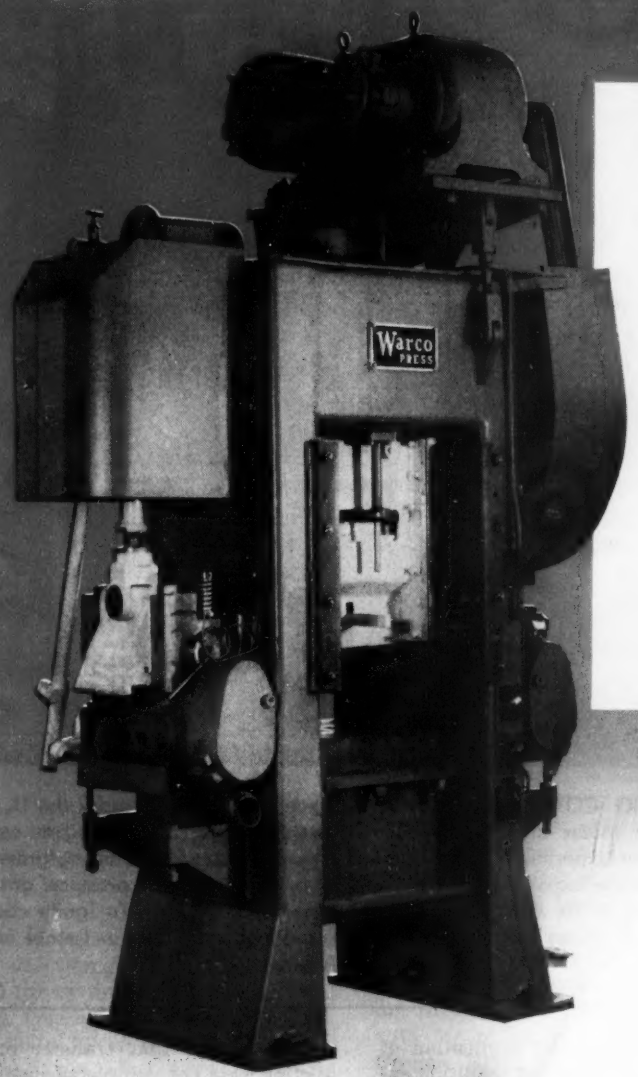
Ford on Big Business

HENRY FORD II made some interesting comments on big business at a recent address before the Harvard School of Business Administration. He said, "A big company often seems to have a strange personality or no personality at all. The man in the street is not a statistician or an economist. He is accustomed to making up his mind about people on a simple basis —whether they are honest or dishonest friendly or unfriendly, public spirited or antisocial, generous or selfish. But a big company is too often like the side of an elephant, you cannot make head or tail of it very easily. People can be made to fear or dislike it, or even want to destroy it, by political opportunists."

Chrysler Engineers on Overtime

IN RECENT days, Chrysler has recalled a number of body engineers and put them on overtime schedules, for what purpose it is not yet clear. A guess might be that the corporation has decided to speed up introduction of the shorter-wheelbase versions of Dodge and Plymouth models, including the Dodge roadster, to be sold at lower prices, in the expectation both Ford and GM may have lower prices in the next 60 days.

What is a High Production Press?



• To Warco engineers the term "High Production Press" does not mean merely a press that is geared to operate at a great number of strokes per minute. It means a press capable of producing a great number of stampings **accurately** and **continuously** at high speeds with a minimum of maintenance.

Features — such as the following — make Warco the most popular High Production Press in the field.

The Warco Precision Double Roll Feed has been designed for the high-speed operation required in conjunction with Warco High Production Press, and incorporates the following features:

1. All moving parts of feed are designed to keep the weight to a minimum consistent with strength and rigidity requirements. This results in greater feeding accuracy
2. Infinite variation in feed lengths from zero to maximum
3. Synchronized scrap shear, if required
4. Height of feed line easily adjustable
5. Stock oiler "built in"
6. Feed rolls hardened and ground

1. Rugged welded steel frame fully stress-relieved and designed for utmost rigidity
2. Square gibbing with hand-scraped bronze liners fitted to close tolerances, assuring accurate alignment
3. Full eccentric shaft with extra long, rigid supporting bearings
4. Barrel type oversized adjusting screw, with short, rugged one-piece Pitman assuring stiffness in connection
5. Lightweight slide and air counterbalancing to reduce shock of "breakthrough"
6. Automatic oil lubrication to all wearing surfaces
7. Variable-speed Drive
8. Warco pneumatic friction clutch and brake
9. All adjustments conveniently located and easily made
10. Die space accessible from both front and rear, providing ideal conditions for setting dies
11. Provision for installing die cushions if required

Federal WELDERS®

RESISTANCE WELDERS FOR EVERY APPLICATION • PRESSES FROM 50-TON OBI TO 2000-TON DOUBLE ACTION

THE FEDERAL MACHINE AND WELDER COMPANY

Dept. 449 Warren, Ohio • • Offices in Principal Cities

Warco® PRESSES

Allegheny Expansion

Since the war may cost about $25 million when program is completed

ALLEGHENY Ludlum Steel Corp. has spent more than $15 million on plant improvements since the war, and when the program is completed these expenditures will approximate $25 million.

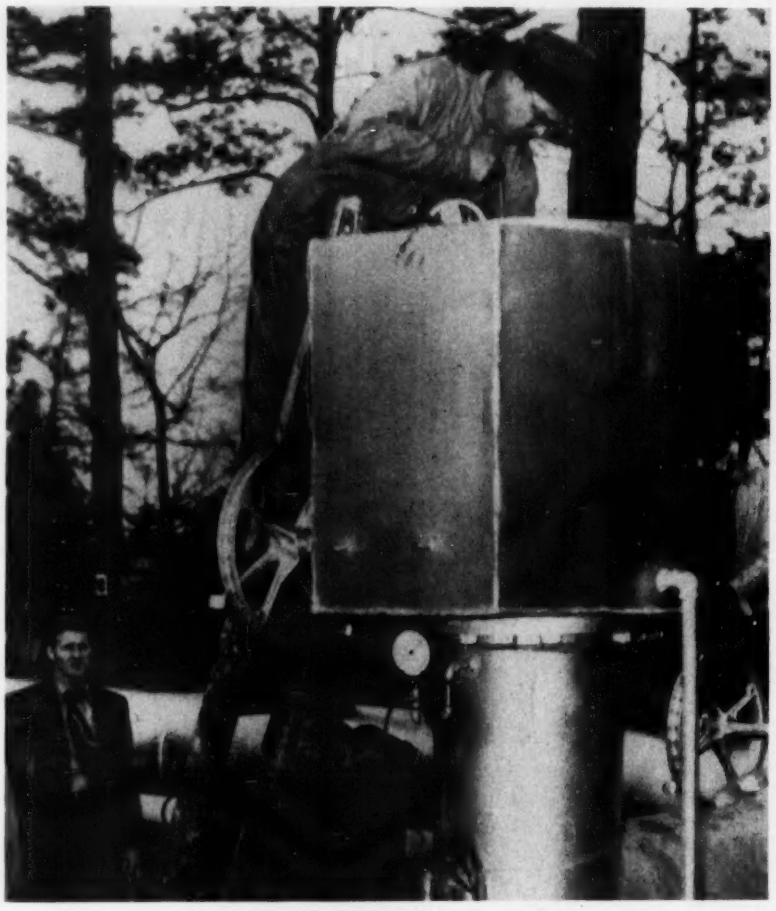
Major improvement in 1948 at Brackenridge, Pa., was a three-way project including a new blooming mill, a new slab reheating mill and ultimately improvements in the hot strip mill. The hot strip mill modifications are now under consideration and work will be started when the engineering is complete.

At the West Leechburg, Pa., plant, the new continuous rolling mill for the cold reduction of stainless and electrical strip, installed earlier in the program, began to operate on a production basis in 1948 and made possible record shipments of flat rolled products during the year. Other construction at this unit includes new facilities for the copper coating of steel strip and new pickling equipment.

The Watervliet, N. Y., plant had as its major improvement installation of a new blooming mill, scheduled for operation in May. At Dunkirk, N. Y., the Brigham Road plant is being re-equipped as a wire mill. The Buffalo foundry installed an induction melting furnace, x-ray inspection apparatus, new casting equipment and a new building for pattern storage. Wallingford Steel Co., a subsidiary, installed new annealing equipment last year, and a new tandem cold rolling mill has been ordered.

Customer companies are assisting in financing a $5.5 million project, separate from the general Allegheny Ludlum program, to build an electric melting shop at Brackenridge. The facilities, comprising two 70-ton and two 60-ton top charge furnaces, will have a rated ingot capacity of more than 400,000 tons annually when producing carbon steel, as is initially planned. The furnaces are scheduled to come into production from April to July, 1949.

The company earned $6,833,384 in 1948, compared with $6,002,657 in 1947.



GASIFYING COAL: Using equipment once destined for Russia, the U. S. Bureau of Mines and the Alabama Power Co. are conducting a coal gasification experiment near Birmingham. The new test is an outgrowth of small-scale experiments two years ago, and seeks to produce gases for heating or for conversion into gasoline or diesel oil. To ignite coal, a Bureau of Mines employee drops a thermite bomb down a funnel into a mine. NEA photo

Will Spend Added $20 Million

SINCE Pittsburgh Consolidation Coal Co., Pittsburgh, was formed in 1945, improvements together with work on new developments and acquisition of property have required capital expenditures of about $48.5 million. Completion of projects now under construction and those to be started in 1949 will require additional expenditures of approximately $20 million, of which $17.5 may be spent this year.

Coal mined by the company in 1948 amounted to 26,072,111 tons as compared with 24,307,155 tons in 1947. Total coal marketed by the company in 1948 was 34,266,784 tons as against 36,495,662 in the previous year. Net income for 1948, exclusive of profit from disposal of properties, was $21,316,340 compared with $13,833,006 in 1947.

New Plant Ups Tube Firm's Net

MOVE by Standard Tube Co., Detroit, into new facilities last year boosted net earnings to $462,128, highest in the past ten years, despite the fact that transfer of production was not completed until Mar. 1, 1948, and that full capacity operations were impossible throughout the remainder of the year because of lack of steel.

Net sales of welded tubing and fabricated parts for 1948 totaled $6,092,925, compared with $4,507,489 the preceding year. Percent profit on sales was 7.6 in 1948 compared with 1.5 in 1947.

New Wheeling Mill on Test Basis

NEW continuous tube mill at the Benwood Works of Wheeling Steel Corp., Wheeling, W. Va., is operating on a test basis.

Built at a cost of about $4 million, the new tube mill will be running at or near capacity within 30 days. It is currently being operated only a few hours a day. The unit will be used to make small-size pipe.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Atomic Energy Commission has selected an area in the Snake river plains of Idaho as the site for a new national reactor testing station. The area includes the Navy's proving grounds at Arco and negotiations are under way to transfer the property to the commission.

—o—

Economic Cooperation Administration announces that the period during which delivery of goods may be made against fourth quarter 1948 procurement authorizations has been extended to June 30, provided contracts were completed by Apr. 1.

—o—

Continental Can Co.'s new plant in West Mifflin Borough, Pa., is now under construction. Its construction features a new method of precasting concrete foundations and sills in 20-ft sections developed by Wigton-Abbott Corp., Plainfield, N. J.

—o—

Whiting Corp., Harvey, Ill., has appointed Minnesota Supply Co., Minneapolis, as agent for foundry equipment in Minnesota, the Dakotas and parts of Iowa and Wisconsin.

—o—

Lukens Steel Co., Coatesville, Pa., reports 963 men and women have been employed by it or its subsidiaries for 20 years or more.

—o—

Bureau of Mines has made public a report describing German production of coal-tar by low temperature methods. A free copy of information circular 7490, "German Low-Temperature Coal-Tar Industry," may be obtained from Publications Section, Bureau of Mines, 4800 Forbes St., Pittsburgh 13.

—o—

Plasteel Products Co., Washington, Pa., manufacturer of protected roofing and siding materials, has named Lewis & McDowell Inc., New York, as its representative in the New York city area.

—o—

Foundry Equipment Co., Cleveland, has appointed Eastern Distributing Corp., Richmond, Va., as distributor of its line of Coleman core and mold ovens covering Virginia.

—o—

Diamond Chain Co. Inc., Indianapolis, has named the following additional firms as distributors: Century Supply & Equipment Co., Akron; Hines Bearing & Industrial Supply, Billings, Mont.; Ross Willoughby Co., Columbus, O.; Ralph Shawaker Co., Toledo, O.; Joseph E. Loughead Co., Kalamazoo, Mich.; J. W. Vaughan Co., Greenville, S. C.; Crossley Co., Erie, Pa.; Mine & Smelter Supply Co., El Paso, Tex.; and Harry Cornelius Co., Albuquerque, N. M.

—o—

Ohio Electric Mfg. Co., Cleveland, announces appointment of Curtis-Holcomb Co., Jacksonville, Fla., as representative in Florida for its lifting magnets and magnetic controllers. H. R. Harris Co., Minneapolis, will serve in a similar capacity in Minnesota and northern Wisconsin.

—o—

Elastic Stop Nut Corp. of America, Union, N. J., is manufacturing nylon strip up to 2 inches wide and ranging in thickness from 0.020 to 0.100 inch, for use in spring interleaving.

—o—

Defiance Machine Works, Defiance, O., builder of machine tools, has been put up for sale by its owners. Al E. Reuben Co., Toledo, O., realty firm is handling the sale.

—o—

Hotpoint Inc., Chicago, General Electric Co. subsidiary, is doubling scheduled production of its new automatic washing machine, raising production to 2000 units per week. The firm reports that sales in the first two months of 1949 were the highest in its history.

—o—

Auburn & Associates Inc., engineering firm specializing in electrical layouts for mills, has moved from the Grogan Bldg. to larger quarters in the Dalzell Bldg., Pittsburgh.

—o—

Independent Pneumatic Tool Co., Aurora, Ill., maker of Thor portable power tools, is building a new sales office in Toronto, Canada, which is expected to be ready by June 1. In the meantime, company headquarters in Toronto remain at 32 Front St. West.

—o—

Lofland Co., processor and distributor of steel products and construction materials, has opened a new $200,000 office, warehouse and plant in Dallas.

—o—

Reynolds Electric Co., manufacturer of flashers, circulating fans and electric motors, has moved from Chicago to 3000 River Rd., River Grove, Ill.

—o—

American Steel & Wire Co., Cleveland, U. S. Steel Corp. subsidiary, reports its American Works has received the National Safety Council's distinguished service award for its record of 3 million man-hours worked without a lost-time accident.

—o—

Cutler - Hammer Inc., Milwaukee, manufacturer of electric control apparatus, announces the following new sales office locations: Newark, N. J., branch, 155 Washington St.; Columbus, O., office, 2700 E. Main St.; Youngstown office, 25 E. Boardman St.

—o—

Rheem Mfg. Co., San Francisco, has begun work at its Sparrows Point, Md., plant on one of two contracts totaling $1.5 million for pressurized steel containers used in storing and shipping airplane engines.

—o—

General Electric Co., Schenectady, N. Y., has awarded fellowships amounting to $18,460 to 15 graduate students for advanced study. Charles A. Coffin awards went to seven for study in electricity, physics and the physical sciences. Gerard Swope fellowships went to eight for work in industrial management, engineering, the physical sciences and various scientific and industrial fields.

—o—

Layne & Bowler Inc., Memphis, Tenn., maker of pumps and well screens, has added General Filter Co., Ames, Iowa, to its 16 affiliated well water supply companies. J. P. Lawlor remains as president of General Filter which offers a chemical and engineering service in the water conditioning field.

—o—

Williams & Co. Inc., Pittsburgh, distributor of stainless and other steels, nonferrous metals and many other products, has moved its Cincinnati warehouse into new quarters at 3231 Fredonia Ave. which double the capacity of the former faciilty.

—o—

Wagner Electric Corp., St. Louis, maker of electric motors, transformers and industrial braking equipment, has purchased a plant at Mt. Vernon, Ill., which will be used for production of transformer tanks. Wagner has increased its manufacturing capacity by about 50 per cent since the end of the war.

—o—

Delta Mfg. Division, Rockwell Mfg. Co., Milwaukee, is sponsoring a series of "welding clinics" on the West Coast to demonstrate the work potentials of its new welders. Demonstrations will be held in Portland, Oreg., Apr. 5; Seattle, Apr. 7-8; and Vancouver, B. C., Apr. 9. Clinics have been held in San Diego, Los Angeles and San Francisco.

The Business Trend

CONTINUATION of the decline in business activity was experienced in the week ended Mar. 26 as STEEL's industrial production index fell off another point to 168 per cent (preliminary) of the 1936-1939 average. Low level of freight carloadings due to the miners' walkout was, for the second consecutive week, a major factor in holding down the overall production index.

PRODUCTION—Federal Reserve Board's industrial production index declined to 189 per cent of the 1935-1939 average in February from 191 in January and 194 in February, 1948. Similar declines were experienced in almost all industrial classifications listed by the board except the iron and steel industry whose index rose to 231 in February from 228 in January and 203 in February a year ago.

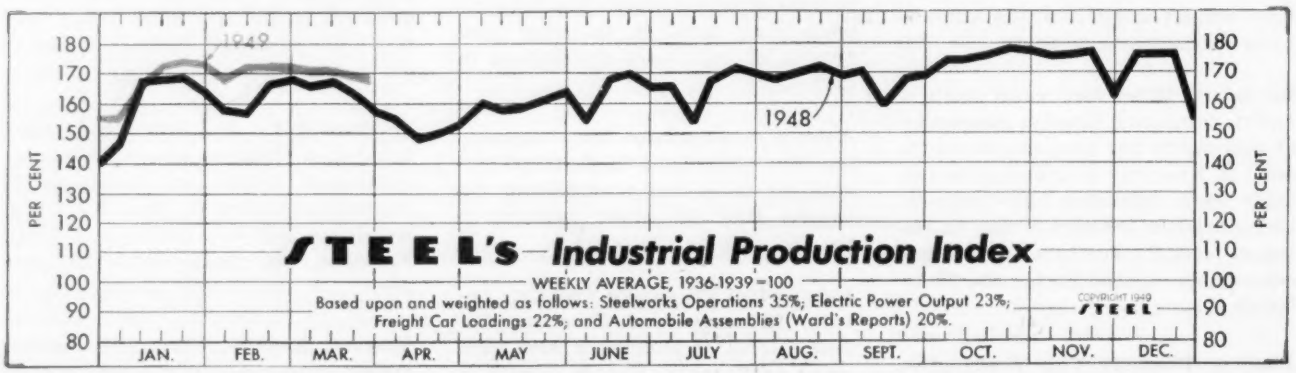
STEEL—Production of steel for ingots and castings continued at high levels in the week ended Mar. 26, attaining 101 per cent of capacity and equal to about 1,862,000 tons. Despite the current high level of activity in the steel industry, some furnaces have been shut down in recent weeks.

AUTOMOBILES—Lack of frames at several divisions of a major builder caused automobile and truck assemblies to drop to 119,339 units in the week ended Mar. 26 from the revised total of 120,741 for the preceding week. Greater availability of steel is expected to result in the highest level of passenger car production since 1937 during the second quarter of this year. This estimate depends, however, on elimination of the wildcat strikes and resultant component shortages which have plagued automobile builders in the postwar period.

PRICES—Consumers' price index of the Bureau of Labor Statistics declined to 169 per cent of the 1935-1939 average from 170.9 in the period from Jan. 15 to Feb. 15. This was the fifth consecutive month in which the index decreased and the largest decline since the bureau began to calculate the index on a monthly basis in late 1940. The bureau's weekly wholesale price index also declined 0.2 per cent in the week ended Mar. 22 to 158.2 per cent of the 1926 average, 0.2 per cent lower than four weeks ago and 2.6 per cent less than in the comparable week a year ago.

COAL—Production of bituminous coal was 2,875,000 net tons in the week ended Mar. 19 with the large drop in production due to the miners' walkout. In the corresponding week last year output was also down to 4,413,000 tons because of a strike occasioned by the welfare fund dispute. For the year to Mar. 19, bituminous coal production aggregates 113.4 million tons compared with 138.1 million tons in the corresponding period last year.

BUSINESS—Sharp rise in business failures was experienced in February, according to a tabulation by Dun & Bradstreet Inc. February's failures totaled 685, the highest number in any month since 1942 and considerably steeper than the usual seasonal rise for the month.



Index (chart above): Week ended Mar. 26 (preliminary) 163 Previous Week 169 Month Ago 171 Year Ago 158

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	101.0	101.5	100.0	93.0
Electric Power Distributed (million kilowatt hours)	5,404	5,496	5,559	5,065
Bituminous Coal Production (daily av.—1000 tons)	476	1,725	1,793	736
Petroleum Production (daily av.—1000 bbl)	5,130	5,145	5,344	5,377
Construction Volume (ENR—Unit $1,000,000)	$180.9	$127.3	$75.6	$137.9
Automobile and Truck Output (Ward's—number units)	119,339	120,741	118,815	107,284

* Dates on request. † 1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	603†	608	688	664
Business Failures (Dun & Bradstreet, number)	166	210	180	101
Money in Circulation (in millions of dollars)‡	$27,423	$27,500	$27,551	$27,851
Department Store Sales (changes from like wk. a yr. ago)‡	−16%	−8%	−9%	+9%

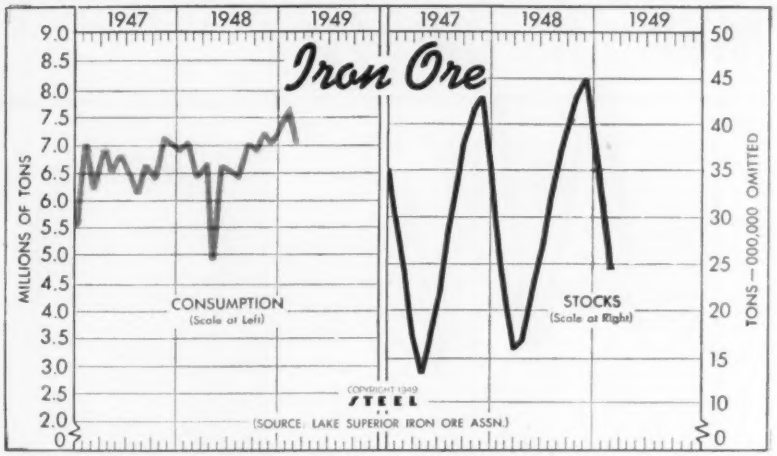
† Preliminary. ‡ Federal Reserve Board.

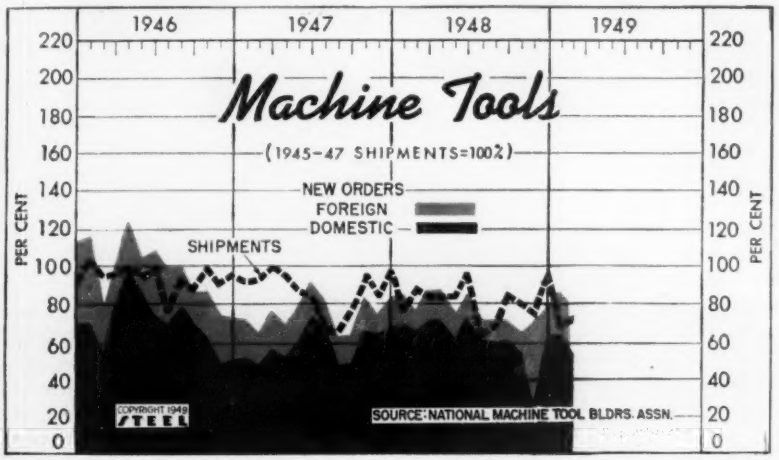
Iron Ore

(Lake Superior Iron Ore Assn.)

Gross tons—000 omitted

	Consumption		Stocks at Lake Erie Docks and Furnaces	
	1949	1948	1949	1948
Jan.	7,590	7,057	31,904	29,081
Feb.	6,992	6,440	24,981	22,628
Mar.	....	6,634	.....	16,022
Apr.	....	4,976	.....	17,125
May	....	6,656	.....	22,058
June	....	6,577	.....	26,965
July	....	6,479	.....	32,611
Aug.	....	7,036	.....	37,081
Sept.	....	6,965	.....	40,923
Oct.	....	7,273	.....	43,883
Nov.	....	7,058	.....	45,160
Dec.	....	7,351	.....	39,460
Total	....	80,504		





Machine Tools

(1945-1947 Shipments = 100)

	Orders				Shipments	
	Total		Domestic			
	1949	1948	1949	1948	1949	1948
Jan.	87.0	83.1	65.1	69.1	68.8	75.3
Feb.	81.0	77.3	54.4	64.6	70.4	87.1
Mar.	...	86.3	...	70.2	...	83.6
Apr.	...	86.3	...	72.2	...	82.0
May	...	73.5	...	62.1	...	82.6
June	...	83.4	...	71.5	...	94.4
July	...	74.0	...	61.1	...	62.4
Aug.	...	73.7	...	60.9	...	69.8
Sept.	...	73.1	...	61.5	...	84.7
Oct.	...	67.4	...	53.4	...	80.4
Nov.	...	72.2	...	54.1	...	76.2
Dec.	...	76.7	...	60.5	...	96.9

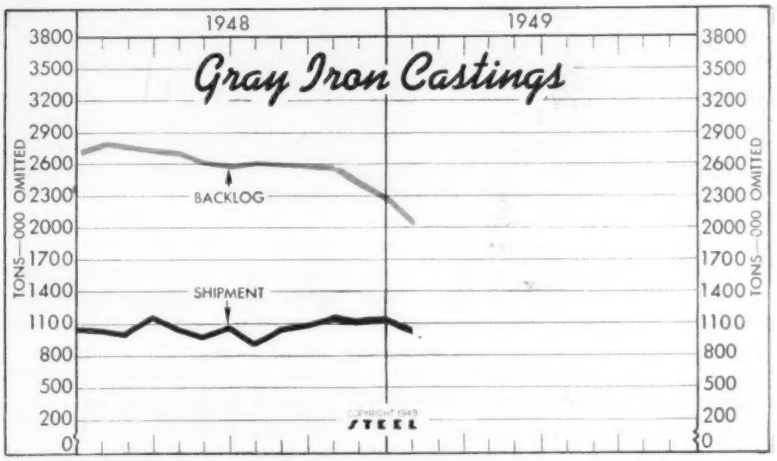
Gray Iron Castings

(U. S. Bureau of Census)

Tons—000 omitted

	Shipments		Backlogs*	
	1949	1948	1949	1948
Jan.	1,040	1,064	2,065	2,803
Feb.	....	1,024	....	2,769
Mar.	....	1,169	....	2,726
Apr.	....	1,051	....	2,691
May	....	993	....	2,602
June	....	1,072	....	2,587
July	....	914	....	2,601
Aug.	....	1,051	....	2,599
Sept.	....	1,088	....	2,587
Oct.	....	1,148	....	2,523
Nov.	....	1,100	....	2,407
Dec.	....	1,111	....	2,284
Total	....	12,786		

*Unfilled orders for sale to the trade.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$14,078	$13,872	$11,421	$14,155
Federal Gross Debt (billions)	$251.8	$252.0	$252.6	$253.1
Bond Volume, NYSE (millions)	$14.4	$14.5	$14.8	$20.5
Stocks Sales, NYSE (thousands)	4,204	3,894	3,427	5,706
Loans and Investments (billions)†	$62.4	$62.0	$62.0	$63.8
United States Gov't. Obligations Held (millions)†	$33,112	$33,206	$32,890	$36,061

† Member banks, Federal Reserve System.

PRICES

STEEL's Composite Finished Steel Price Average	$97.23	$97.32	$97.77	$81.14
STEEL's Nonferrous Metal Composite‡	220.4	223.5	232.6	189.5
All Commodities†	158.2	158.5	158.5	162.4
Metals and Metal Products†	177.6	177.6	178.1	156.0

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

Men of Industry

STANLEY M. HUNTER

WALLACE H. HITCHCOCK

CHARLES J. PAUMIER

Stanley M. Hunter has been elected to fill the newly created position of executive vice president of American Hoist & Derrick Co., St. Paul. He joined the sales department of the company in 1936, and has served as vice president of sales and a member of the board of directors since 1945.

—o—

Robert C. Tait, Pittsburgh banker, was named president, Stromberg-Carlson Co., Rochester, N. Y. He succeeds **Dr. Ray H. Manson,** president since 1945, who has been named chairman of the board. **Wesley M. Angle,** retiring chairman and one-time president, who has devoted more than 45 years to the company's service, was elected honorary chairman of the board.

—o—

Frank R. S. Kaplan, first vice president, Copperweld Steel Co., Glassport, Pa., has been elected acting president of the company, filling the vacancy in that office caused by the death last week of **S. Eugene Bramer.**

—o—

Hy-Pro Tool Co., New Bedford, Mass., a division of Continental Screw Co., announces promotion of **Robert A. Smith** to the position of sales manager. He joined Hy-Pro as an engineer upon his release from the armed forces, and was later transferred to the sales department.

—o—

Ronald E. Griffiths, for three years supervisor of American Steel & Wire Co.'s research laboratory in Cleveland, has been appointed assistant director of research for the company, and, in this post, will be assistant to **Walter O. Everling,** director of research. Mr. Griffiths succeeds **Willis T. Cramer,** transferred to the post of division metallurgist, for corrosion-resisting alloys, in the company's metallurgical department. Succeeding Mr. Griffiths as supervisor of the research laboratory is **Roland O. Hartman,** since 1936 a member of the research staff.

—o—

Wallace H. Hitchcock has been appointed division manager, and **Charles J. Paumier,** works manager of the Pacific Coast Division, recently established by Revere Copper & Brass Inc. in Los Angeles. The new rod and tube mill in the central manufacturing district is the nucleus of the new division.

—o—

Willis T. Windle has been elected treasurer and controller, Carborundum Co., Niagara Falls, N. Y. He formerly was associated with National Supply Co., Pittsburgh.

—o—

Clifton M. Kolb has been elected senior vice president and member of the executive committee, Glidden Co., Cleveland. He has been secretary of the company since 1929.

—o—

Roger F. Waindle, general manager, Industrial Products Division, Elgin National Watch Co., Elgin, Ill., has been elected to the board of directors of the American Society of Tool Engineers.

—o—

The following have been elected directors of Beryllium Corp., Reading, Pa.: **Anita Berger, Otto T. Englehart, Maurice A. Hallam, Richard M. Quimby,** and **Daniel D. Schwartz.** Mr. Englehart was elected president, **Matthew J. Donachie,** vice president, Mr. Quimby secretary, and Anita Berger, assistant secretary and treasurer.

—o—

Frank Weir, St. Louis district sales manager of Harbison-Walker Refractories Co., Pittsburgh, has been promoted to Pittsburgh district sales manager. He succeeds **Harold S. Dunn,** recently named general sales manager. Mr. Weir has been St. Louis district sales manager for the past three years. He joined the Pittsburgh sales department in 1923, and has since been connected with the New York, Boston, Buffalo and St. Louis sales offices.

—o—

William S. Loose, former director of the laboratory development section of the magnesium laboratory, has been appointed magnesium division sales manager, Dow Chemical Co., Midland, Mich.

—o—

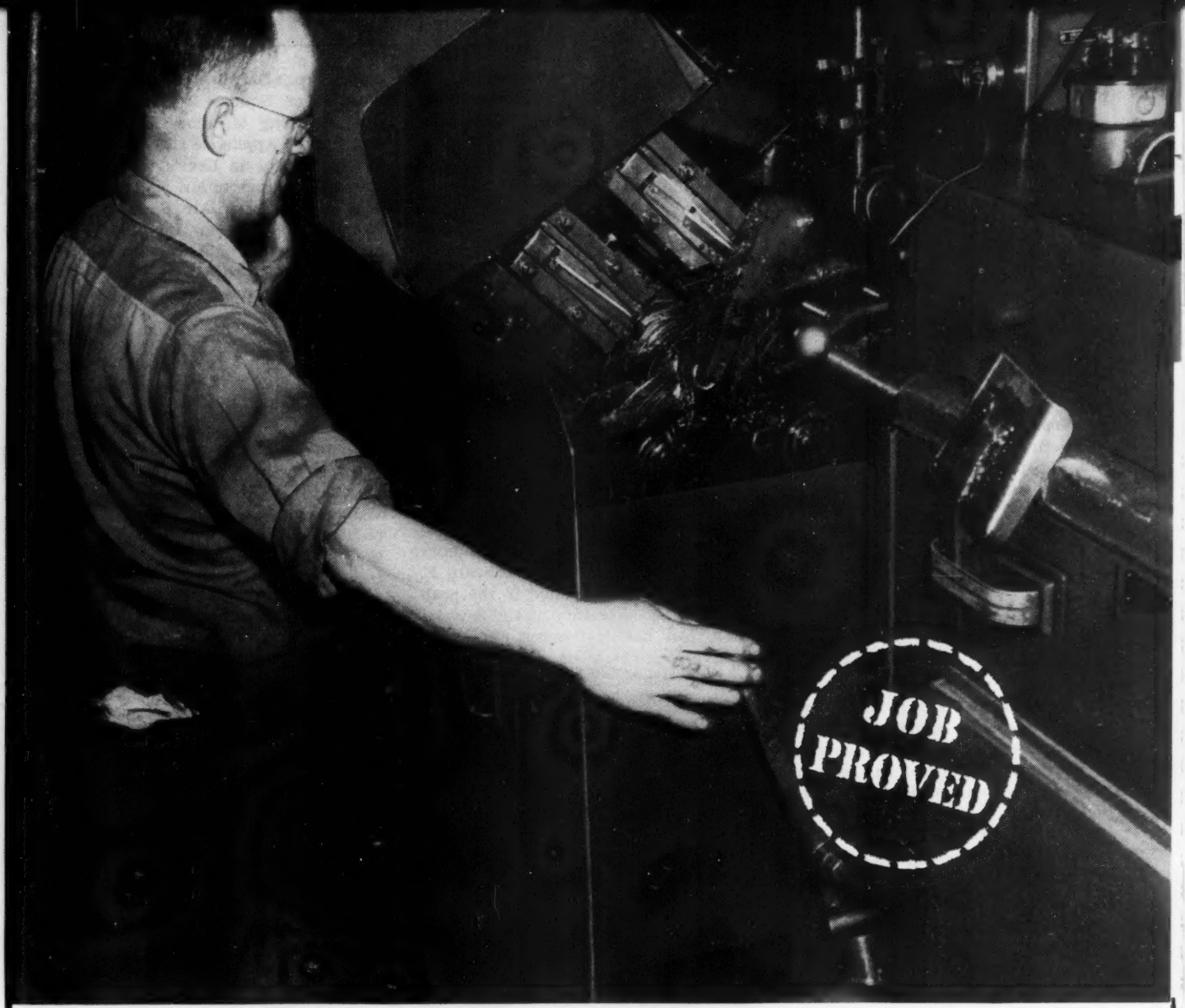
Ernest F. Becher has been promoted from vice president to executive vice president of Barcalo Mfg. Co., Buffalo. He will be in charge of all manufacturing.

—o—

James E. Ziegler has been appointed to the sales engineering force of the Cooper Alloy Foundry Co., Hillside, N. J. He will be stationed in Cleveland in order to provide increased technical service to the Pittsburgh-Cleveland-Detroit areas.

—o—

Big Three Welding & Equipment Co., exclusive distributor in the Southwest for Nelson Stud Welding Division, Morton Gregory Corp., Lorain, O., announces appointment of **Robert B. Coppage** as stud welding specialist in the Fort Worth-Dallas territory. He served Nelson as a sales engineer



ONE OIL DOES TWO JOBS

One New Sunicut Grade with Petrofac* Replaces Two Oils, Gives Improved Performance and Lowers Costs

Part: Knurled rise nuts for Stillson wrenches
Operation: Spot, drill, knurl, and cut off
Machines: New Britain Model 61's
Materials: SAE X1112 and X1113 Bar Stock
Tools: Rex AA High-Speed Tool Steel
Cutting Speed: 156 S.F.P.M.
Cycle Time: 9.9 seconds
Production: 363 pieces per hour per machine

A manufacturer of wrenches was using two oils in his automatic screw machines—a dark cutting oil and a lubricating oil. Replacing both with one grade of new Sunicut with Petrofac, he found the way to many benefits. Savings have been substantial. Dilution of cutting oil through seepage is no longer possible. Drain-off from chips is increased. There is only one oil to buy, store and handle. Finish is better, tool life longer, work visibility improved.

Because the new Sunicut grades with Petrofac possess superior metal-wetting, antiweld and extreme-pressure qualities, they are giving outstanding performance throughout the metal working industry. They are not blended with animal or vegetable fatty oils—cannot turn rancid. For more information write for folder S-4.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

*Petrofac is a trademark of Sun Oil Company.

SUN PETROLEUM PRODUCTS
"JOB PROVED" IN EVERY INDUSTRY

SUNOCO

in Cleveland, St. Louis and Chicago prior to joining the Big Three organization at Fort Worth. **Jack W. Harris** has been named stud welding specialist for Oklahoma Oxygen Co., Tulsa, Okla., distributor of Big Three Welding & Equipment Co.'s products, and exclusive distributor in Oklahoma for Nelson Stud Welding Division.

—o—

Lucian J. Harris was transferred from the Chicago sales office to the Los Angeles sales office of Chicago Bridge & Iron Co., Chicago.

—o—

The 1948 Lamme Medal of the American Institute of Electrical Engineers has been awarded to **Dr. V. K. Zworykin,** vice president and technical consultant, RCA Laboratories Division, Radio Corp. of America, Princeton, N. J.

—o—

Kryn C. Hamelink has been elected to the board of directors and made vice president and general manager of American Hydraulics Inc., Sheboygan, Wis. **William H. Schmidt** has resigned as director, general manager and treasurer, and **Chester H. Schmidt** as vice president and assistant general manager. **E. R. Mayr** was elected treasurer. Mr. Hamelink has been controller of American Hydraulics Inc. since 1944.

—o—

Milton A. Dixon will be promoted Apr. 16 to manager of the lubricating and industrial sales department, Standard Oil Co. (Indiana), Chicago, to succeed the late **Harry J. Saladin. John M. Gower** will be promoted to manager of the lubricating bulk sales department.

—o—

Paul E. Lundquist has been appointed sales manager of the newly formed Construction Equipment Division, Pettibone Mulliken Corp., Chicago. Formerly vice president of Republic Drill & Tool Co., Mr. Lundquist will assist **E. J. Seifert,** president, Pettibone Mulliken Corp.

—o—

C. M. Hatcher has been appointed to the newly created post of advertising and sales promotion manager with Baker Refrigeration Corp. at its plant in South Windham, Me.

—o—

Osborn Mfg. Co., Cleveland, announces personnel changes within the sales organization of its Brush Division as follows: **P. A. Malling,** formerly assigned to the New Jersey area, has been transferred to Los Angeles, where he will cover the West Coast. **John McGinnis,** formerly of Osborn's sales service department in its Cleveland headquarters, will cover Cincinnati, Kentucky and western Tennessee. **Joseph Hammond** has been transferred from eastern Pennsylvania to the New Jersey area. **E. M. Schoemmell Jr.,** formerly of the Virginia and Maryland sales area of the company, has been transferred to eastern Pennsylvania. **L. F. Holfelder** will move his sales headquarters from Cincinnati to the Virginia-Maryland area. **Robert Ruthenberg** has been transferred from the Chicago office to Milwaukee to take over the Wisconsin territory formerly served by **A. L. Nevers,** resigned. Due to the retirement of **F. B. Atwood,** the Vermont and part of Massachusetts area will now be included in the territories covered by **H. C. Donovan** and **G. B. Pecsok.**

—o—

John P. Ahern has been elected executive director, National Foundry Association, Chicago, and **Edward E. Fries** has been promoted to the position of field secretary of the association. For the last seven years Mr. Ahern has been on the executive staff, Manufacturers Association of Connecticut Inc. Mr. Fries has been on the administrative staff of National Foundry Association for the past several years.

—o—

Charles E. Pearson has been appointed co-ordinator of sales, production and engineering of Speed Grip Nut Retainer, a new product manufactured by Tinnerman Products Inc., Cleveland, and for which a new division has been established. Mr. Pearson served for seven years as superintendent for National Stamping Co., and was associated for 10 years with Mt. Clemens Metal Products Co.

—o—

Harold R. Boyer, Thomas M. Belshe and **O. C. Hall** have been elected directors of Lear Inc., Grand Rapids, Mich. Mr. Boyer is director of production engineering for General Motors Corp., Detroit, and also is a director of Square D Co., Detroit, Gear Grinding Machine Co., Detroit, and Parker Appliance Co., Cleveland. Colonel Belshe is Lear's representative at Washington. Mr. Hall is president of Northern Air Service Inc., Grand Rapids. Lear Inc. also announces election of **A. F. Haiduck** as vice president for the Romec Division, and **A. C. Handschumacher,** assistant secretary.

CHARLES E. PEARSON

—o—

Edward A. Miller has been appointed general manager of the Building Panel Division of Detroit Steel Products Co., and will move his offices from Buffalo to Detroit. He has been chief engineer of the division for the past three years. Mr. Miller succeeds **William Gillett,** who has been appointed vice president, assistant to the president. Mr. Miller is secretary-treasurer of the Metal Roof Deck Technical Institute, and chairman of the Light Steel Manufacturers & Fabricators Group.

—o—

Walter V. Davison Jr. has been appointed assistant to the president of W. B. Connor Engineering Corp., New York. He was associated with the management engineering firm of Stevenson, Jordan & Harrison Inc.

—o—

L. M. Gumm has been appointed metalworking consultant for the industrial sales department of Westinghouse Electric Corp., at East Pittsburgh, Pa. For the past 11 years Mr. Gumm has been manager of the steel mill and metalworking section of that department. **K. M. Patterson** has been appointed manager, steel mill and metalworking section. He has been special representative in the Transportation & Generator Division.

—o—

Pittsburgh Steel Co., Pittsburgh, announces appointment of two purchasing agents: **Joseph G. Smith,** former district sales manager for the company in New York, and **W. A. Hibler,** former assistant purchasing agent for the company. **Robert W. Mullin,** formerly assistant district manager, has been appointed district sales manager, Pittsburgh district, and **Alfred S. Gardner** has been appointed assistant sales manager, Pittsburgh.

—o—

L. W. Ecke, plant superintendent and secretary, Davidson Enamel Products Inc., Lima, O., has been elected president to succeed the late **F. S. Davidson.** Mr. Ecke assisted Mr. Davidson in the company's organization in 1926. **R. J. DeVoe,** executive vice president, was re-elected and was also named treasurer. Other elections

Ohio Rolls

SHAPING METAL FOR ALL INDUSTRY

STEEL... ON THE WAY WITHOUT DELAY

Greater production is the demand today. With Ohio Rolls doing their usual efficient job you can depend on more tonnage between dressings . . healthier profits.

Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, Holl-O-Cast Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Denso Iron Rolls, Nickel Grain Rolls, Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, O.

H. F. WARDWELL
Elected chairman of the board of directors, Detroit Steel Products Co., Detroit. Noted in STEEL, Mar. 28 issue, p. 62

W. C. OWEN
Who has been elected president, Detroit Steel Products Co., Detroit. Noted in STEEL, Mar. 28 issue, p. 62

were: **Harry R. Meredith,** secretary; **A. C. Weierich,** vice president, Architectural Division; **John W. Timmermeister,** assistant secretary and treasurer; and **W. J. Behrens,** comptroller.

—o—

R. R. Estill has been appointed general superintendent, Fluorspar Division, United States Coal & Coke Co., at Mexico, Ky. He has been associated with the subsidiary company of United States Steel Corp. since 1939. Mr. Estill went to Germany in 1947 as the American chairman of the Allied Coal Commission, which undertook the rehabilitation of the coal mining industry in the Ruhr.

—o—

Arthur E. Fryer, engineer, announces he has resumed private practice, and that he will specialize in materials handling and plant layouts. He will maintain offices at 2207 Ashland Ave., Toledo, O.

—o—

Thomas W. Wright has been appointed to the sales staff of Babcock & Wilcox Tube Co.'s New York district office. He has been a member of the metallurgical staff of the company at Beaver Falls, Pa.

—o—

F. C. Schulz has been named office and operating manager, Associated Lines Sales Division, B. F. Goodrich Co., Akron.

—o—

J. U. Neill has been appointed manager of the Parts Division of the Locomotive & Car Equipment Divisions, General Electric Co., Schenectady, N. Y. He has served with the company for more than 22 years, and has been engaged in work on design, application, sale and servicing of electric transportation equipment.

—o—

Robert B. Douglas, Montreal, Canada, was elected president of the American Society of Tool Engineers, Detroit. He is president of Godscroft Industries Ltd., and succeeds **I. F. Holland,** Hartford, Conn. Other officers named are: **Herbert L. Tigges,** vice president, Baker Bros. Inc., Toledo, O., first vice president; **J. J. Demuth,** general superintendent, Sligo Iron Stove Co., St. Louis, second vice president; **Halsey F. Owen,** professor of industrial engineering, Purdue University, Lafayette, Ind., third vice president.

—o—

John J. Hall, formerly vice president and general sales manager, has been elected president of the Richmond Radiator Co., Uniontown, Pa. He became associated with the firm, an affiliate of Reynolds Metals Co., in 1944. He previously was vice president and general sales manager of American Radiator & Standard Sanitary Corp.

—o—

Frederick S. Bartlett has been appointed factory manager of the Bristol, R. I., plant of United States Rubber Co.

—o—

Arthur A. Blue has been appointed manager of the Instrument Division, Thomas A. Edison Inc., West Orange, N. J. He has been acting as assistant manager of the division for the past six months. Mr. Blue was formerly associated with W. W. Slocum & Co., Newark, N. J., consulting engineer.

—o—

Donald G. Morse has been appointed director of the General Motors Corp.'s employee suggestion plan section of the employee relations staff, Detroit. He succeeds the late **John M. Jerpe.**

—o—

In his new capacity as Missouri River Division engineer, Corps of Engineers, **Brig. Gen. Samuel D. Sturgis Jr.** will direct river control projects now under construction in the Missouri river basin. In this post he succeeds **Maj. Gen. Lewis A. Pick,** now chief of engineers. Now serving as deputy director of the Army general staff's Organization & Training Division, Gen. Sturgis will take over his new duties about May 15.

—o—

Meredith, Simmons & Co. Ltd., the Canadian subsidiary of National Starch Products Inc., New York, a producer of industrial adhesives, announced the election of **Arthur B. Meredith** to chairman of the board. Other officers include **Frank Greenwall,** president, **Ronald M. L. Francis,** executive vice president and general manager, and **Ernest Hofmann,** vice president in charge of operations at Montreal.

—o—

L. A. Hyland, executive engineer, Bendix Aviation Corp., Detroit, has been appointed a member of the Research & Development Board's Committee on Guided Missiles.

—o—

Nicholas M. Walker has been appointed to the Packaging & Labeling Division, Pennsylvania Salt Mfg. Co., Philadelphia, to assist in matters relating to labeling and registration of Pennsalt products.

—o—

Reorganization of field supervision of the Mechanical Goods Sales Division, Goodyear Tire & Rubber Co., Akron, thereby reducing the size of territories to be controlled by division managers, is as follows: The new Eastern Sales Division, consisting of Boston, New York, Pittsburgh and Cleveland districts, will be in charge of **O. A. Schilling.** Central Sales Division, comprised of Chicago, Detroit, Minneapolis and Cincinnati districts, will be under the supervision of **H. E. Langdon. R. B. Warren** will take over the Southern Sales Division, including Charlotte, N. C., Atlanta, St. Louis and Dallas districts. **R. G. Abbott,** who will continue as district manager in Los Angeles, will head the Western Sales Division.

—o—

Alex K. Tinker has been named manager of the New York branch sales office of National Radiator Co., Johnstown, Pa., and **Fred S. Hudson** succeeds him as Pittsburgh branch manager. Mr. Tinker held the position at Pittsburgh since 1931, and Mr. Hudson had been a sales engineer since 1936 in the company's Richmond, Va., and Washington branch offices. **Robert E. Daly** has been named northwestern district sales representative of the company,

D. M. COOPER

Representative to steel industry in northwestern Pennsylvania for National Gypsum Co., Buffalo. STEEL, Mar. 28 issue, p. 62

and has established offices at 3355 E. 182nd St., Seattle.

—o—

Armco Steel Corp., Middletown, O., announces that **Robert S. Gruver,** manager of the Ashland, Ky., Division, becomes administrative assistant, Operating Division, with offices in Middletown; **J. M. Lobaugh,** general superintendent at Ashland, succeeds to Mr. Gruver's former position; **Harry N. Nicholson** was appointed general superintendent and **George H. Todd,** assistant, both at Ashland.

—o—

H. L. Kent, formerly manager, railroad department, Ingersoll-Rand Co., Chicago, has been appointed assistant to the president, Standard Railway Equipment Mfg. Co., with headquarters in the company's New York office.

—o—

Roy Perkins has been appointed manager, blast furnace department, F. H. McGraw & Co., Pittsburgh. Prior to his appointment he was working on blast furnace projects for the company.

—o—

James E. Power has been appointed manager of national accounts sales for the Mechanical Goods Division, United States Rubber Co., New York. **W. A. Tipton** was appointed manager of branch sales for that division, and **O. S. True** as district sales manager for the division's New York branch.

—o—

James M. Darbaker has been appointed general manager of sales, Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of United States Steel Corp. He has been manager of operations in the Chicago district since 1947. **Stephen M. Jenks,** general superintendent, Gary Works, has been appointed to succeed Mr. Darbaker, with headquarters in Pittsburgh.

NORMAN F. TISDALE

Has been named manager of sales for Molybdenum Corp. of America, Pittsburgh. Noted in STEEL, Mar. 28 issue, p. 58

OBITUARIES . . .

Clifton Slusser, 56, vice president of Goodyear Tire & Rubber Co., Akron, since 1926, died Mar. 25. In failing health for a number of years, he relinquished his position on the board of directors and most of his arduous production duties two years ago.

—o—

Oscar Lampl, 44, assistant manager, Dravo-Doyle Co., Pittsburgh, died Mar. 23. Before joining Dravo-Doyle in 1937, he was employed by Blaw-Knox Co., Great Lakes Glass Co., and Truscon Steel Co.

—o—

James W. Gosselin, 28, production manager, Graver Tank & Mfg. Co. Inc., East Chicago, Ind., was killed in an automobile accident in Chicago Mar. 27.

—o—

James W. Bryce, 68, inventor and chief consultant, International Business Machine Co.'s engineering and development laboratory, died Mar. 27 in Montclair, N. J.

—o—

Virgil L. Downing, 59, chief design engineer of Nash-Kelvinator Corp. at Kenosha, Wis., died Mar. 21 following a short illness.

—o—

John F. Morse, 81, for 20 years a mechanical engineer with the former Wellman-Seaver-Morgan Co., Cleveland, and in later years treasurer of the Morse Instrument Co., died Mar. 22 at his home in Hudson, O.

—o—

Walter J. Felber, 35, assistant sales manager, Inland Steel Co., Chicago, died of injuries suffered in an automobile collision, Mar. 19.

—o—

John Markell, 61, retired manager of the New York export office, explosives department, E. I. du Pont de Nemours & Co. Inc., died recently in St. Petersburg, Fla.

—o—

Dr. Harvey C. Rentschler, 68, physicist and inventor, who was director of research for the Lamp Division, Westinghouse Electric Corp., at Bloomfield, N. J., from 1917 to 1947, died Mar. 23 at his home in East Orange, N. J.

WALTER RUFUS HOWELL

Late president of Bliss & Laughlin Inc., Harvey, Ill., died Mar. 15. Noted in STEEL, Mar. 28 issue, p. 63

—o—

Leland G. Harwood, secretary, Taylor & Fenn Co., Hartford, Conn., died Mar. 14.

—o—

Paul J. Houck, 50, purchasing agent for Pratt & Letchworth Co. Inc., Buffalo, died Mar. 19 at his summer home in Ridgeway, Ont.

—o—

Benjamin F. Waterman, 69, head of the mechanical planning department, Brown & Sharpe Mfg. Co., Providence, R. I., died Mar. 22 after a prolonged illness. He had been employed by the company for more than 50 years.

—o—

Raymond H. Kelley, 60, manufacturer of steel barrels, who headed his company, Perfection Steel Container Co., Cleveland, died Mar. 29.

—o—

William H. Williamson, president, City Brass Works, Hamilton, Ont., died recently in Toronto, Ont.

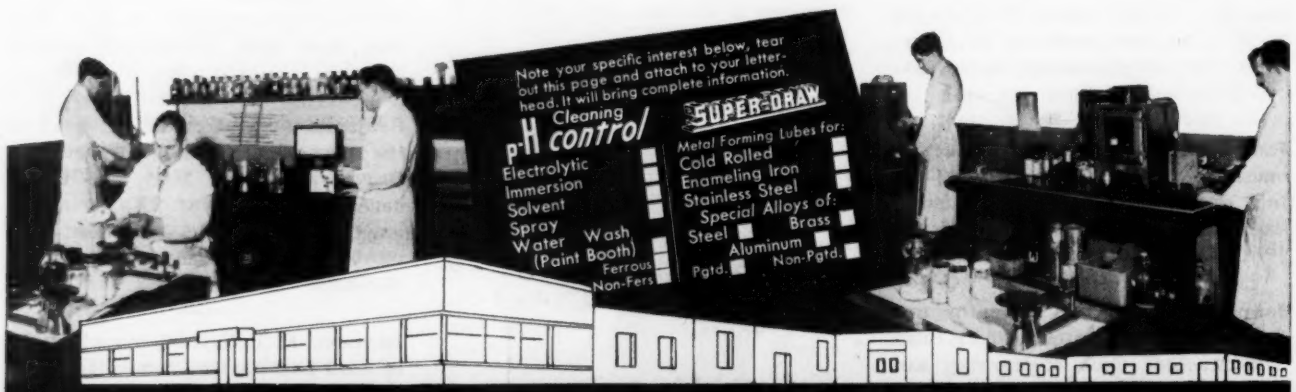
—o—

Paul Biersach, 78, founder of the Milwaukee and Wisconsin Associations of Sheet Metal Contractors, died Mar. 24.

"Lubricates the Overspray"

is Number ONE on the HIT PARADE

NORTHWEST Water Wash Compound for paint spray booths actually "lubricates the overspray" . . . there are other products to break down the paint . . . but with NORTHWEST "Number ONE"—each particle of paint is coated with a non-volatile solvent. And as it hits the waterspray it can't stick to the back curtain or any of the eliminators. The booth keeps clean and the sludge remains floating for easy skimming . . . What nails down the "Number ONE" place on the HIT PARADE though is both lowest material and maintenance costs . . . Let our technicians consult you on this or any of your other cleaning problems . . . there are thirty-five standard Northwest products in this field alone.



LO HI pH

NORTHWEST CHEMICAL CO.

9310 ROSELAWN AVE. DETROIT 4, MICH.

pioneers in pH cleaning control—serving you since '32

Engineering News . . . AT A GLANCE

REJECT SALVAGER— At least 75 per cent of the pressure castings rejected now can be saved through use of a new impregnating process developed recently by High Vacuum Processes Inc., Philadelphia. The method, the company states, eliminates all small leaks in pressure castings with the aid of a thermosetting resin. Cost of processing the castings when employing the "vacron" process, as it is called, is very low.

CO-ORDINATED POWER— Handling of materials in the plant yard of Austin Bros. Steel Co., Dallas, Tex., was recently speeded up at least 25 per cent by merely hooking up a high-speed gasoline engine to a low-speed hoist, and coordinating the motions of the two by V-belts. According to engineers of Gates Rubber Co., the "ropes" in this case serve as a resilient link between engine and hoist, protecting both against shocks inherent in hoist operation. Installation also is estimated to save the company some $700 per year in maintenance.

"FLYING" TEMPER ROLLING CONTROL—Stiffness of steel strip utilized for tin cans is measured by the length added as the mill rolls it thinner by a new device developed by research engineers of Carnegie-Illinois Steel Corp. In daily use at the Gary, Ind., plant, it operates at speeds as high as 2000 feet of strip per minute to insure that sheets for the same kind of cans are uniform in stiffness, and that steel of varying stiffnesses are rolled for cans of varying sizes and shapes. Instrument measures final stiffness by comparing speed of the strip as it enters final rolls of the rolling operation with its faster speed as it emerges from them.

FAST "SPILL" SLICER— Powder cutting process currently used by Jones & Laughlin Steel Corp., to cut up skulls, and buttons to charging-box size is reported to reduce cutting of an open hearth spill to a minor chore. The method, which involves the combined use of a Linde blowpipe and powder cutting attachment, enables the task to be completed in a matter of 2 days. Previously 30 working days were required to do the same job by lancing. At the Pittsburgh works, an average of 1000 tons of metal per month is salvaged in this manner for open hearth use.

SPEEDS UP PICKLING—Patents for new processes of cleaning and pickling steel strip and wire at high speed on continuous lines were granted recently to John. S. Nachtman, Youngstown. According to the inventor, the new lines will be straight-away types permitting speeds of up to 2000 feet per minute. He plans to license companies to use his processes.

"SPUN" PISTON RINGS— Besides a new alloy, a special centrifugal casting process is responsible for the doubled strength and 50 per cent more "spring" incorporated in the automotive piston rings currently produced by the Piston Ring Department, Koppers Co. Inc. Pittsburgh. "Spinning" process used, the company reports, is relatively new to this industry. It involves melting of the special alloy in an electric furnace and pouring it into a special casting machine, cylinder of which rotates at high speed. Centrifugal force pushes the hot metal to the cylinder walls, forming a cylinder within a cylinder as its cools. Inner cylinder is then pulled out and heat treated. Other high-production machines are used to "slice" the cylinder into rings of desired size.

DOUBLE CHECKS QUALITY—Engineering laboratory in the Scintilla Magneto Division of Bendix Aviation Corp., Sidney, N. Y., plays an important roll in keeping product quality up to standards. Finished units and systems processed are tested periodically to detect relaxation of vigilance of inspection personnel. Reports of these tests go to the quality control manager and to government inspectors, if involved. (p.98)

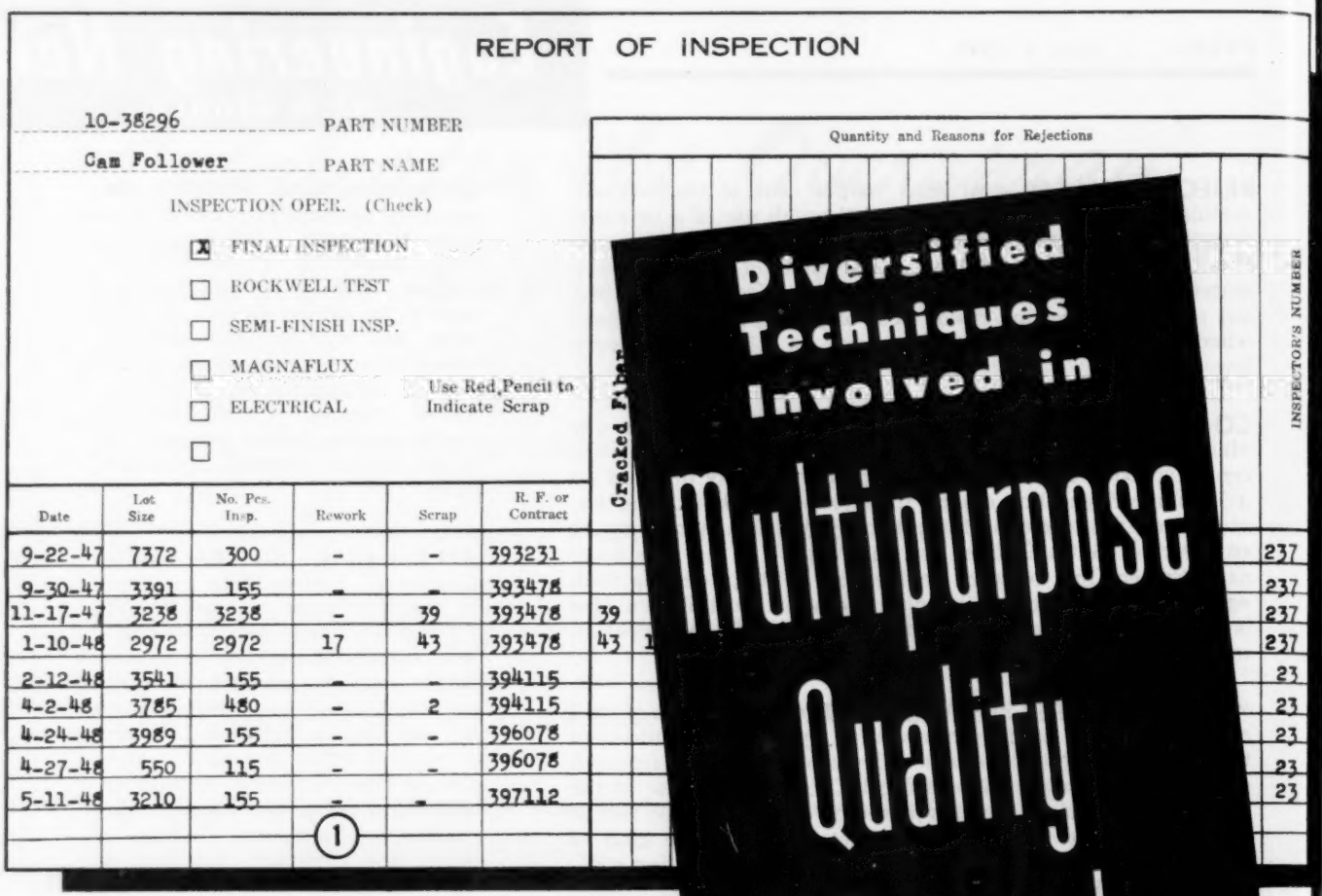
APPEARANCE NO FACTOR — Large-scale electroplating operations in the Hawthorne unit of Western Electric Co., Chicago, involve very little surface preparation procedures. Bright appearing plated finishes such as bright nickel and chromium are not essential on telephone handsets or central office apparatus. Here, zinc or zinc conversion coatings are applied to parts for corrosion protection, and composite coatings of nickel and chromium are used on high performance relay parts to prevent sticking of working faces to provide wear resistance and corrosion protection. (p.102)

ROLL PASS DESIGN—Many things must be considered in roll pass design, Ross E. Beynon, superintendent of the roll department, Carnegie-Illinois Steel Corp., points out. Among these are roll diameters and speeds, heating capacity and temperature at which the bar is finished. Passes also must be designed so the draft is within power capacity involved which includes other factors too numerous to mention. As these designs range from rounds and squares, flats, angles, beams and channels etc., successful designs can only be achieved by years of study, experience and determination on the part of the designer. (p.112)

BATTERY LIFE—Today's industrial chores demand 100 per cent more work from a storage battery it was pointed out recently before a materials handling gathering at Fenn College, Cleveland. Thus it is important to keep a tight check on factors effecting battery lift. Trucks operating in low or high temperatures, for example, require larger batteries because battery capacity decreases rapidly under such conditions. (p.126)

Diversified Techniques Involved in Multipurpose Quality Control

By O. W. HITCHCOCK
Quality Manager
Scintilla Magneto Division
Bendix Aviation Corp.
Sidney, N. Y.



REPORT OF INSPECTION

10-38296 PART NUMBER

Cam Follower PART NAME

INSPECTION OPER. (Check)

- [X] FINAL INSPECTION
- [ ] ROCKWELL TEST
- [ ] SEMI-FINISH INSP.
- [ ] MAGNAFLUX
- [ ] ELECTRICAL

Use Red Pencil to Indicate Scrap

Date	Lot Size	No. Pcs. Insp.	Rework	Scrap	R. F. or Contract	Quantity and Reasons for Rejections: Cracked Fiber	INSPECTOR'S NUMBER
9-22-47	7372	300	-	-	393231		237
9-30-47	3391	155	-	-	393478		237
11-17-47	3238	3238	-	39	393478	39	237
1-10-48	2972	2972	17	43	393478	43	237
2-12-48	3541	155	-	-	394115		23
4-2-48	3785	480	-	2	394115		23
4-24-48	3989	155	-	-	396078		23
4-27-48	550	115	-	-	396078		23
5-11-48	3210	155	-	-	397112		23
			(1)				

No matter how well a system is planned, it is only effective if carefully operated. Statistical and other methods used to control manufacture of high precision aircraft parts are applicable to almost any metal product made under ordinary or unusually severe specifications

QUALITY control is often regarded as a necessary evil, but when the system of operation is carefully devised and intelligently operated, it yields benefits that greatly outweigh its costs. Such benefits are not all tangible but they are none the less real.

In many instances, quality can be greatly improved by application of modern statistical methods, for these provide a continuous check on quality and also a warning of any tendency toward a loss in the control of quality before quality limits are exceeded. Such methods are used to great advantage at Scintilla along with other methods here outlined. Although these methods apply to such parts as aircraft ignition systems, diesel fuel injection equipment and other high precision products, the methods are not confined to these and are applicable to almost any metal and to many nonmetallic products made under either ordinary or unusually severe specifications.

Here quality control involves controls of manufacture and assembly as well as tests for dimensions, surface finish, electrical, magnetic, physical and chemical properties, pressure tightness and many other properties. It aids production departments to improve their methods, to cut costs and to reduce scrap. Also involved is investigation of field service complaints and customer and supplier liaison so that first-hand information is available and delays in correcting errors are minimized.

Quality control department is on a level with those charged with engineering, production, sales and service and is responsible, through the quality manager, directly to the division manager. The quality control department is composed of two groups. No. 100 handles quality control and No. 99 inspection.

Customer Co-operation — Close co-operation with government and with other customer quality control programs is maintained. No. 100 determines what to inspect, how much to inspect and how to inspect and issues forms giving precise instructions and space for records. All quality decisions rest with No. 100, except decisions on nonconforming products that are made by a materials review board on which quality

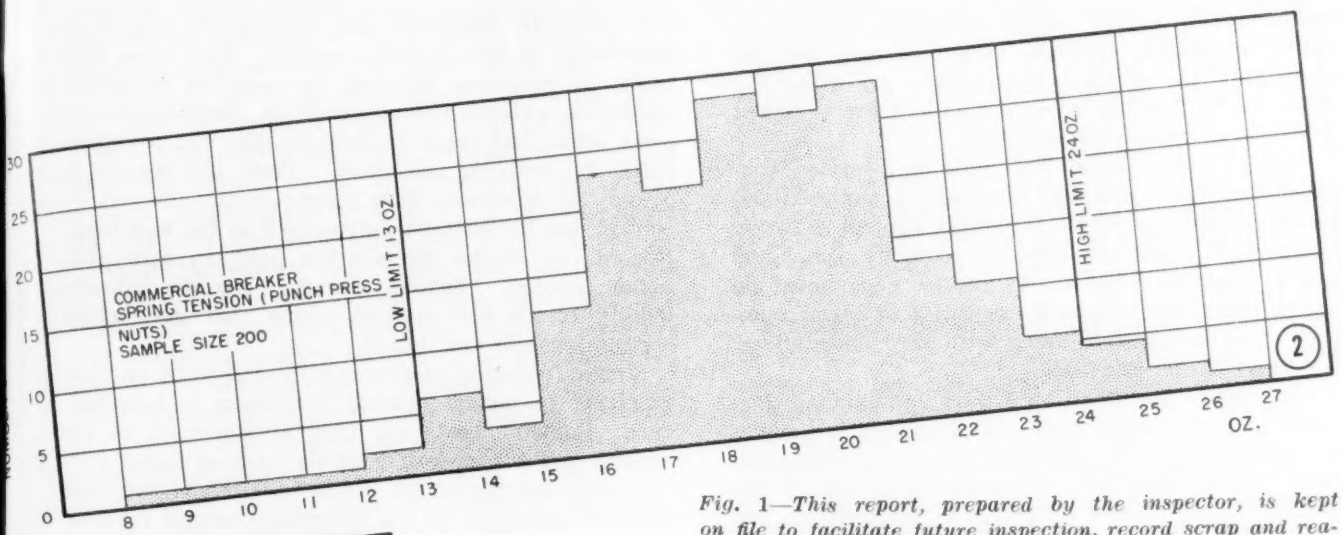


Fig. 1—This report, prepared by the inspector, is kept on file to facilitate future inspection, record scrap and reasons for same and indicate steps that may avoid future troubles

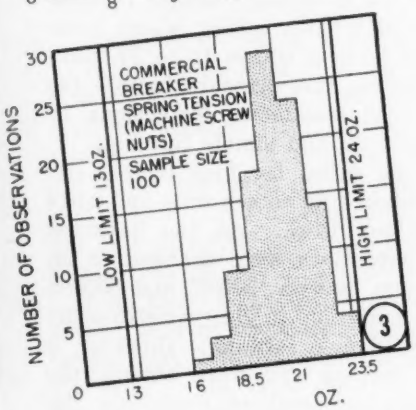


Fig. 2—Frequency distribution showing results of spring tension inspection at a time when quite a few percentages were outside low and high limits, indicating that corrective action was needed

Fig. 3—After altering a fastening nut, this distribution was made showing that all springs have tensions within the limits set

control, engineering and government inspection are represented.

All nonconforming products go to a scrap crib and are reviewed by quality control and production supervision to acquaint foremen with errors and corrective action needed. Definite scrap is disposed of and products that may be salvaged go to a materials review crib for board action. Only customer and government approved salvage measures are used. Rework is handled under quality control direction, scrap and rework being charged back against departments and operators responsible through an IBM tabulation.

Floor inspectors check parts in process on 15 to 20 machines, take corrective action as soon as work is outside limits set and can shut down machines when drastic action is needed. Only parts or materials that pass inspection may go to stock rooms or stores.

All materials purchased are inspected at the source or by the materials laboratory. Materials passed and color-coded go to stores. Only one standard for a given material is set, hence only materials acceptable to any customer are found in stores.

Bench Inspections—All parts except those subjected to statistical quality control are bench-inspected before going to stores. Bench inspections occur before critical processing, such as heat treating or plating. From stores, parts go to assembly; assembly operations are checked after which tests and final inspection precede government or customer inspection.

In the engineering laboratory, finished units and systems are tested periodically to detect relaxation of vigilance of inspection personnel. Reports of these tests go to the quality manager and to government inspectors. A weekly report of assembly rejects is used by quality control and goes to production executives so that they can "trouble shoot" and avoid recurrence of errors that cause rejections.

Weekly IBM tabulations of scrap are broken down by departments responsible to show dollar, material and labor losses and causes thereof and are made the basis of corrective action with follow-up by the quality and factory manager offices.

Precise tool and gage inspection is done under quality control in a room kept at constant temperature and humidity. Periodic inspections of this kind insure quick detection of gage wear or damage and all gages are inspected before return to cribs, hence only checked gages are found there.

Liaison with Vendors — Liaison with vendors is carried on directly by the supervisor of purchased parts inspection. Only specified materials can be purchased unless a substitute is approved by the engineering materials laboratory, the project engineer, the quality manager and government or customer representatives. Receiving inspection issues reports to the vendor with copies to purchasing, accounting and production planning. These reports show rejections, give notice of poor quality and state disposition of parts or materials for such corrective action as is necessary and feasible.

Weekly meetings led by the quality manager are held with engineering and production representatives, inspection supervision, plant superintendent and design engineering representative any of whom may present a pertinent problem. Causes of troubles are

sought and necessary action is agreed upon as to quality standards, methods, design changes and responsibility for errors. Assignments are made for action or for further investigation and are reviewed as needed at subsequent meetings.

Through close liaison with sales and service, customer complaints and field troubles are analyzed and necessary action relative to quality control is taken. Returned products are inspected to verify complaints and a report is made to the service department on action taken and probable quantities or serial numbers of units affected, along with recommendations, if further action is needed.

Diversified Techniques — Among outstanding features of quality control are the diversified techniques and methods applied both to job lot and to mass products. These take into account the nature of the product and the effect on precision, performance and interchangeability.

Precision gaging of critical parts is tied up with statistical control in such a way as to produce practical and efficient results. A magnet tester designed and made by the company is used to check magnetic materials critical in magnetos. Duplicate testers were made for vendors to aid them in controlling magnetic properties of their product. Some such materials are screened 100 per cent, but the practical approach is to sample inspect incoming materials to maintain quality level so that rejection of units at final inspection will cost less than would 100 per cent material inspection.

An objective is, through emphasis on manufacture, to establish processing and machine setups so that 100 per cent inspection is not necessary. Sampling inspection actually used indicates continued control or warns when further screening is necessary. Actually, a correct process of sampling often results in higher quality levels and less scrap and rework than when 100 per cent inspection was used.

Statistical Methods — Successful use of statistical methods of quality control results in large measure from the simplified procedure followed in procuring data. A record of each inspection is kept by the inspector on a form shown in Fig. 1, applicable both to bench and to testing inspection. Such reports, identified by part number and type of inspection, provide a running record of quality level, including changes in quality and past troubles. These reports acquaint both inspectors and supervisors with past experience on the products covered. Data thus collected at minimum cost can be analyzed whenever conditions warrant special attention, show trouble in some items and point to savings that can be made safely by reducing inspection. From the reports it is easy to determine what characteristics are out of control and by what amount as well as for how long. Records on similar parts often point to corrective action needed. Vendor material records indicate quality trends and suggest action that may avoid serious troubles and delays.

Simple frequency diagrams help production and engineering to picture existing conditions in manufacture. Control charts are used at machines, at assembly and for overall controls such as scrap percentages and inspection costs. Statistical methods are well explained by the following example relating to a formed commercial breaker spring whose pressure on contacts must be held within 13 to 24-ounce limits. Variables affecting this pressure include the material itself, its heat treatment, dimensions of length, width and thickness and dimple forming.

Original specifications called for blue temper coil stock 0.3125 plus or minus 0.0050-inch wide and 0.014 plus or minus 0.001-inch thick. As the hardness range was large, specifications were changed to include Rockwell hardness between 30N65 and 30N70, insure less thickness variation (0.014±0.00075-inch) and to control closely dimple forming. However, a large percentage of springs still were outside the pressure range in assembled breakers. Frequency distribution, Fig. 2, showed the range to be 8 to 27 ounces and, as this range was wider than for the spring alone, the spring hold-down nut was investigated. Nuts were produced on a punch press and it was found that some presented a convex surface and some a concave surface to the spring.

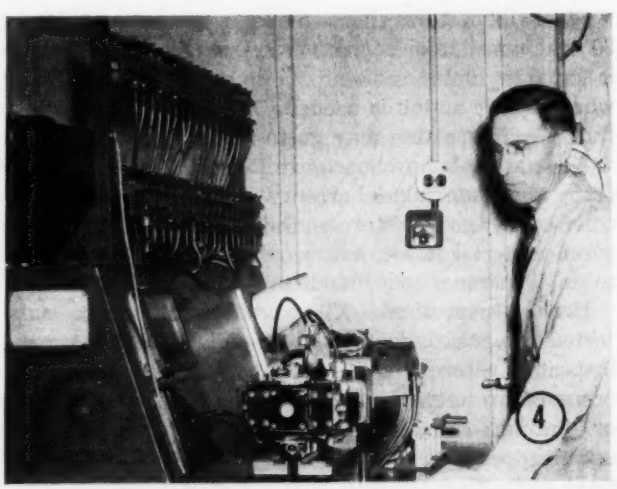
Believing that a flat surface would yield less variation, sample nuts were made on a screw machine and refaced for flatness. Fig. 3 shows the result: All spring assemblies within limits. Both engineering and production promptly agreed that a change in nut making methods was in order. Having brought the

TABLE I
A.O.Q.L. 0.5%

	Trial 1		Trial 2		
Lot Size	Sample	Acc.	Sample	Total	Acc.
76–100	47	0	23	70	1
101–150	60	0	30	90	1
151–400	85	0	50	135	1
401–1000	115	0	125	240	2
1001–4000	155	0	325	480	4
4001–7000	175	0	455	630	5
7001–10,000	300	1	460	760	6

TABLE II
A.O.Q.L. 1%

	Trial 1		Trial 2		
Lot Size	Sample	Acc.	Sample	Total	Acc.
51–100	33	0	17	50	1
101–200	43	0	22	65	1
201–500	55	0	65	120	2
501–1000	65	0	110	175	3
1001–4000	85	0	220	305	5
4001–10,000	165	1	355	520	8



pressure within control limits, inspection procedure was altered from that in Fig. 5 to that in Fig. 6. The latter establishes a control chart check and places the pressure check last as it was no longer the highest cause of rejection. Savings in material, in productive labor and in manufacturing delays more than offset the increase in cost of nuts made by the new method. Inspection labor was cut at least 60 hours per week and product quality was greatly improved.

Double Sampling—"Double sampling" Tables I and II, from Dodge and Romig "Sampling Inspection Tables" are used effectively. "A.O.Q.L." means average outgoing quality level, that is, the quality of several lots after sampling inspection. 0.5 per cent and 1 per cent indicates the poorest quality (percentage passing inspection) to be expected. Lots can include any number of pieces presented for inspection, but if lots are smaller than those given in the tables, 100 per cent inspection must be performed.

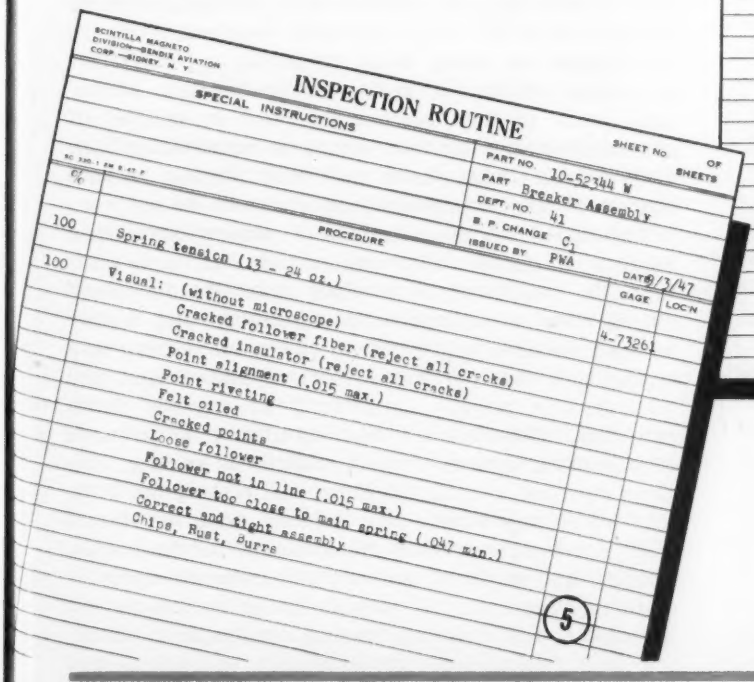
A sample, of course, is the number of pieces drawn at random from a lot to be inspected, trial 1 being the first sample and trial 2 the second sample. The acceptance number (ACC) governs the decision to be made. Suppose, for example that 425 steel bushings are to be inspected before heat treatment and that it has been found uneconomical to have more than 1 per cent defective parts pass this operation. Table II shows that 55 out of 425 pieces must be inspected.

If, in these 55 pieces, none is defective, the lot is passed without additional inspection. But if one defective part is found, a second sample must be taken. For trial 2, the table shows the second sample size to be 65 or a total, with the first sample, of 120, the acceptance number being 2. In this case, since the first sample had one defective, the second sample can have only one defective if the lot is to pass. Hence, if the defectives exceed two, the whole lot would require 100 per cent inspection, and if two defectives were found in the first sample of 55, the whole lot would have to be rejected or undergo 100 per cent inspection, without taking a second sample.

In general, the procedure for double sampling is to completely inspect the first sample and, if the defectives in this sample do not exceed the ACC, the lot is passed. The lot is rejected if defectives exceed the acceptance number associated with trial 2. A second sample is drawn when the number of defectives in sample 1 exceeds the acceptance number (trial 1) but does not exceed the second ACC. When a second sample is taken, lots are passed only when the number of defectives equals or is less than the acceptance number.

Procedural Questions—Questions sometimes arise as to the procedure, when, in inspecting a second sample the rejects exceed the acceptance number before the whole sample is inspected. Decision depends upon the particular situation. If lots are to be rejected and sent to another department for screening or the material is to go back to a vendor as not conforming, it is not necessary to carry the inspection further. But, if detailed inspection is to be performed by the department that does the sampling, the second sample must be completely inspected.

If testing is involved and is costly and rejects cannot be reworked or salvaged, it may be necessary to reconsider the A.O.Q.L. (*Please turn to Page* 128)



SCINTILLA MAGNETO DIVISION—BENDIX AVIATION CORP.—SIDNEY, N. Y.

INSPECTION ROUTINE

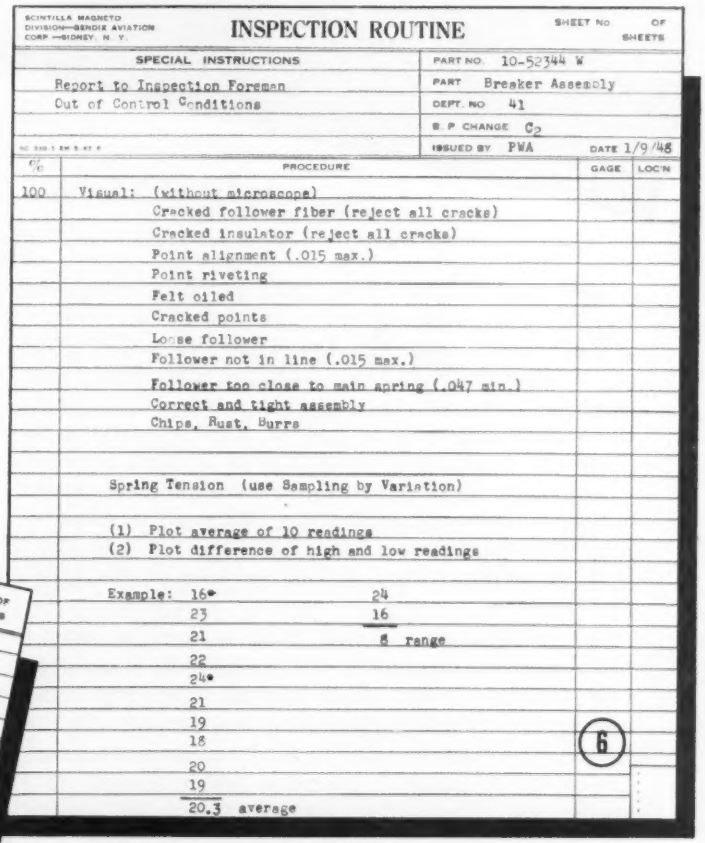
SHEET NO. OF SHEETS

SPECIAL INSTRUCTIONS

PART NO. 10-52344 W
PART Breaker Assembly
DEPT. NO. 41
B. P. CHANGE C_1
ISSUED BY PWA
DATE 8/3/47

C/C	PROCEDURE	GAGE	LOC'N
100	Spring tension (13 - 24 oz.)		
100	Visual: (without microscope)		
	Cracked follower fiber (reject all cracks)		4-73261
	Cracked insulator (reject all cracks)		
	Point alignment (.015 max.)		
	Point riveting		
	Felt oiled		
	Cracked points		
	Loose follower		
	Follower not in line (.015 max.)		
	Follower too close to main spring (.047 min.)		
	Correct and tight assembly		
	Chips, Rust, Burrs		

5



SCINTILLA MAGNETO DIVISION—BENDIX AVIATION CORP.—SIDNEY, N. Y.

INSPECTION ROUTINE

SHEET NO. OF SHEETS

SPECIAL INSTRUCTIONS

Report to Inspection Foreman
Out of Control Conditions

PART NO. 10-52344 W
PART Breaker Assembly
DEPT. NO 41
B. P. CHANGE C_2
ISSUED BY PWA
DATE 1/9/48

C/C	PROCEDURE	GAGE	LOC'N
100	Visual: (without microscope)		
	Cracked follower fiber (reject all cracks)		
	Cracked insulator (reject all cracks)		
	Point alignment (.015 max.)		
	Point riveting		
	Felt oiled		
	Cracked points		
	Loose follower		
	Follower not in line (.015 max.)		
	Follower too close to main spring (.047 min.)		
	Correct and tight assembly		
	Chips, Rust, Burrs		
	Spring Tension (use Sampling by Variation)		
	(1) Plot average of 10 readings		
	(2) Plot difference of high and low readings		
	Example: 16 • 24		
	23 16		
	21 8 range		
	22		
	24 •		
	21		
	19		
	18		
	20		
	19		
	20.3 average		

6

Fig. 4—Inspection operation in a magneto test booth
Fig. 5—Sheet for recording inspection procedure and used in this case for checking a breaker assembly
Fig. 6—Revised procedure on breaker assembly which establishes a control chart check. Spring tension, first on the list in Fig. 5, is now last because corrected practice made it a minor cause of rejection

LARGE-SCALE Electroplating

Combine Automatic and

Highly successful procedures involving the use of full automatic and barrel equipment are used by Western Electric to zinc, nickel and chromium-plate parts for telephone central office switching apparatus

By C. R. FISCHRUPP
Finishing Engineer
Western Electric Co.
Chicago

Fig. 1—Typical unrack position

ELECTROPLATING parts for telephone central office switching apparatus is a large-scale operation, involving the use of full automatic and barrel plating equipment. Since almost all electroplated parts are either hidden as in the telephone handset or part of apparatus located in telephone exchanges, electroplated finishes are applied principally for corrosion protection or a combination of corrosion protection and wear resistance. Therefore only a small amount of surface preparation such as polishing and buffing is done at the Hawthorne plant.

Bright appearing plated finishes such as bright nickel and chromium are not essential in connection with telephone handsets or central office apparatus and equipment manufactured by the company for the Bell System. Instead, zinc or zinc conversion coatings are applied to parts for corrosion protection and composite coatings of nickel and chromium are applied to high performance relay parts for corrosion protection, antisticking of working faces of component relay parts, and wear resistance, respectively. An idea of the amount of plated work receiving a zinc finish may be gained from the daily consumption of ½-ton of ball anodes spread over 0.0002 to 0.0003-inch in thickness.

Although electroplated parts in telephone apparatus need not meet the appearances of parts finished in bright nickel plating baths or the luster of a chromium flast over well prepared undercoatings, the work is required to meet appearance standards for the respective finish as well as exacting thickness requirements. Most of the plated finishes are applied to clean, unprepared surfaces, and allowances are made for surface imperfection of the base metal.

Since the company in some cases processes a large volume of work of similar size, shape and finish, it follows that in such instances production requirements for still plate work are at a level where automatic platers may be economically justified. Western Electric does not use automatic equipment where the number of parts to be plated is not sufficient at normal activity to justify the investment. Therefore, work of this nature produced in several of our smaller unit product shops is necessarily handled in still tanks. Low cost bulk plating in roto barrels is used wherever practicable to do so.

Automatic Platers—Automatic platers present a number of distinct advantages over still tank plating. The important advantages are: (1) Increased output rate as operation is continuous and higher current densities can be used; (2) reduced labor and supervision cost per square foot of plated area and (3) greater product uniformity as regards finish thickness. Other lesser but significant advantages of automatic platers are: (1) Uniform loading, uniform cleaning, rinsing, pickling, and plating interval; (2) lower rejections; (3) reduced drag out losses that represent decreased expenditures for chemicals, anodes, and solution control; (4) reduced operator walking distances; (5) elimination of inconveniences associated with cleaning, rinsing, loading and unloading still tanks, and supplementary operations and

Operations

Bulk Processing

Fig. 2—Inspector testing finish thickness with Magne-Gage

(6) cleaner floors. Summing up the results of uniform operations, specification requirements are met consistently, rejections are lower, and production may be scheduled and deliveries met on time.

Two of the automatic zinc platers are designed and equipped with auxiliary anode bus bar connections mounted on the carrier arms to accommodate conforming anode racks for finishing parts having recessed areas. A 500-amp fuse is inserted in the anode circuit on each carrier arm to reduce damage to costly conforming anode racks should a short circuit occur during any part of the cycle. This arrangement makes it possible to zinc plate irregular-shaped parts that will meet finish specification requirements for thickness of deposit and appearance.

Fig. 3 illustrates a typical return dwell type automatic zinc plater with conforming anode racks suspended from one of the plating arms. First operation in the automatic sequence is racking. Fig. 7 illustrates typical racking position.

Plater operator removes racked work from the stock conveyor and hangs racks from conveyor carrier arms. Following is the sequence of operations:

1. Anodic clean at 6 v in hot alkali, 8 ounces per gallon.
2. Cold water spray rinse (Rinse water is pumped from final spray rinse tank during plater dwell period).
3. Pickle in concentrated uninhibited hydrochloric acid at room temperature using low voltage alternating current supplied by transformer and carbon electrodes.
4. Cold water spray rinse.
5. Anodic clean in 4 ounces per gallon each of sodium hydroxide and sodium cyanide at room temperature.
6. Cold water spray rinse.
7. Plate 8 minutes, 45 seconds at 50 amp per square foot in a standard bright zinc bath.

Ball Type Anode Baskets—Ball type anode baskets are employed and are spaced as required to maintain the metal content of the plating bath. The plating solution is channeled in a 4-inch black iron pipe by gravity into an outside underground storage tank once a week. Main plating tank is cleaned, and the plating solution is returned for operation before the start of the first week-day work shift. Cleaning and pickling tanks are cleaned at routine intervals as determined by analysis. Since solution purification to precipitate harmful amounts of lead and cadmium is accomplished by daily additions of sodium sulphide and copper contamination has not been a problem, the addition of zinc dust has not been necessary for copper removal.

8. Cold water spray after plating.
9. Dip rinse. (Rinse water is pumped from final rinse tank.)
10. Ten-second dip in a chromic acid type passivating solution.
11. Cold water rinse and hot air dry. (The hot air dryer consists of a double row of staggered nozzles through which low pressure heated air is blown. In the first stage of the dryer, cold air is recirculated to mechanically remove as much water as possible as an aid to minimize staining. In the second stage, hot air is recirculated to evaporate any remaining water on the parts.

12. Place finished racked work on stock conveyor and remove at unracking location. A typical unrack position is illustrated in Fig. 1.

Inspection—Thicknesses of zinc are checked nondestructively using a Magne-Gage. Finish inspection procedure most commonly employed is to accumulate parts in shop pans that are loaded on skids and examined for finish thickness and appearance requirements at the convenience of the inspector. Since this method is not practicable when parts are coming out of the platers at a high rate and parts are needed in subsequent operations as soon as they are unracked, an inspection method that eliminated the necessity of storing parts by lots during the inspection period was developed.

An inspector selects five control parts every 2 hours; one part from each of five consecutive plating arms and from a position on the rack that produces a part having a lighter deposit than any other position on the rack. The location of the test part has been determined from inspection data. Three readings taken at the significant area of each part are recorded. The significant area is defined as any area that may be touched by a ¾-inch diameter ball. The median of each set of three readings is recorded, and the median of the five median readings is plotted. In addition, the lowest median value is plotted on a separate curve.

In order for the parts to meet the nominal (preferred minimum) 0.0002-inch thickness requirement, the plotted median value shall not go below 0.0002-inch and the lowest medians shall not fall below 0.0001-inch at the significant area.

If the test samples fail to meet these requirements, the plater operator is immediately notified and steps are taken to increase the deposit thickness. After 20 minutes, another lot of five samples is collected and tested in the usual manner. If these samples are satisfactory, inspection is then resumed at 2-hour intervals. This finish inspection method insures a product of satisfactory quality and avoids delays in delivering finished parts to the next operation.

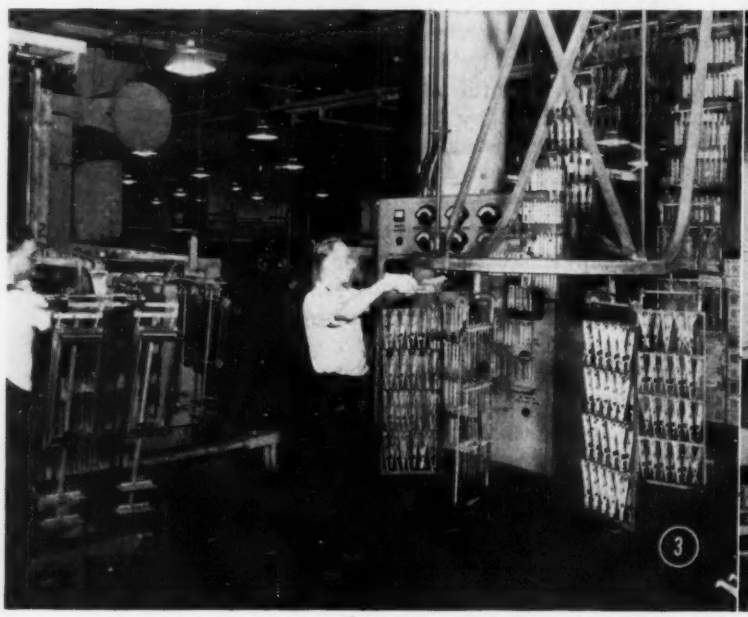
Fig. 2 illustrates inspector testing finish thickness with Magne-Gage.

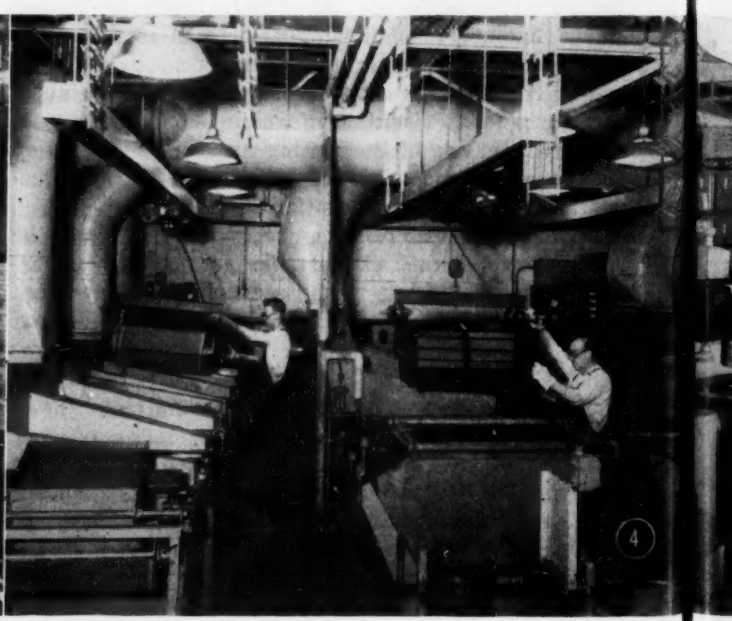
Roto Barrel Plating—Rotopickling and roto barrel plating units are shown in Fig. 4. Note the monorail arrangement and power hoist. Small piece parts such as screws, nuts, clamp plates and spacers are loaded into Monel metal cleaning cylinders. A cleaning cylinder load is 200 pounds, except in some cases, because of shape and size of parts, the load is lighter. Sequence of cleaning operations is as follows:

1. Soaked in hot alkali solution—8 ounces per gallon.
2. Warm water dip rinse.
3. Pickle in concentrated hydrochloric acid pickle, room temperature, no current.
4. Cold water spray rinse.
5. Neutralized in sodium cyanide solution.
6. Cold water rinse.
7. Transfer work from Monel metal cylinder to two hard rubber plating cylinders.
8. Transfer hard rubber cylinders to their respective plating stations.
9. Rinse plated work in warm running water.
10. Passivate zinc finish for 10 seconds.
11. Warm water spray rinse.
12. Unload.
13. Dry in centrifugal dryers.

Our experience with melamine canvas laminate barrels indicates that it is practicable to clean and plate in this type cylinder. However, time studies show that it is slightly cheaper to clean a 200-pound load of parts in a Monel metal cylinder and transfer the load into two hard rubber plating cylinders than it is to clean a similar 200-pound load using two melamine plating cylinders with no transfer operation.

Ampere Hours Required—Ampere hours required to roto-plate a given quantity of different parts to specification requirements have been determined and are incorporated in piece part layouts. The operator





sets the meter hand on the ampere hour setting specified in layouts for respective parts after he has placed the plating cylinder in the plating station. When the ampere hours are used up, a lighted bulb mounted on the control panel is automatically cut out, and the load is removed, rinsed, passivated, rinsed, and dried as explained earlier. The ampere hour method of timing roto-plated work has worked out very well where installed as the proper amount of zinc is deposited over the area of the plating load to produce parts within exacting thickness requirements.

Inspection of roto plated parts is done on a lot by lot basis. A chemical strip method is used for measuring thickness of deposit on small parts which cannot be measured by the Magne-Gage. The inspector selects at random a sufficiently large sample that is weighed on a balance, stripped in a dilute solution of inhibited hydrochloric acid, and reweighed to determine the stripped zinc. Average thickness of coating of the sample under test is required to be not less than nominal (preferred minimum) 0.0002-inch. Threaded parts having more than two times the nominal thickness are required to pass a basic thread "go" gage. Minimum allowable thickness requirements for work finished in roto barrels is higher than the minimum allowable thickness requirement at critical areas of racked work because thickness determinations are made on an average thickness basis. However, on parts tested with a Magne-Gage, finish thicknesses of 50 per cent of nominal 0.0002-inch are permissible at the significant areas.

One of the acid dipping units is illustrated in Fig. 5. Because of the scale produced on piece parts receiving heat treatment, it is necessary to remove this oxide coating before the parts are racked for plating. Annealed parts are placed in perforated Monel metal baskets. The dipping baskets are picked up with a power hoist and transferred to hot inhibited hydrochloric acid. The acid is heated by a carbon immersion type heat exchanger operating in conjunction with a temperature controller. When scale is completely removed, the baskets are transferred into a cold water dip rinse, then neutralized in a sodium cyanide solution, then rinsed in hot water. Baskets are then placed in small centrifugal dryers. When parts are dry, they are transferred into shop pans and delivered to the racking area or shipped out for other operations.

Nickel and Chromium—Nickel and chromium are generally electroplated over many high performance relay parts such as cores and armatures. Minimum thickness of nickel—0.0002-inch—is applied to relay parts for corrosion protection, and 0.0008-inch minimum thickness of chromium is applied for resistance to wear and to minimize tendency of working faces of armatures and cores to stick during the operation of the relay in the telephone circuits. Since operating characteristics of relays are influenced to some extent by thicknesses of the individual deposits, it is necessary to minimize these variations by careful spacing of parts. Relay parts receiving composite coatings of nickel and chromium are plated in conventional return type automatic platers. Separate plating and racking equipment is provided for nickel

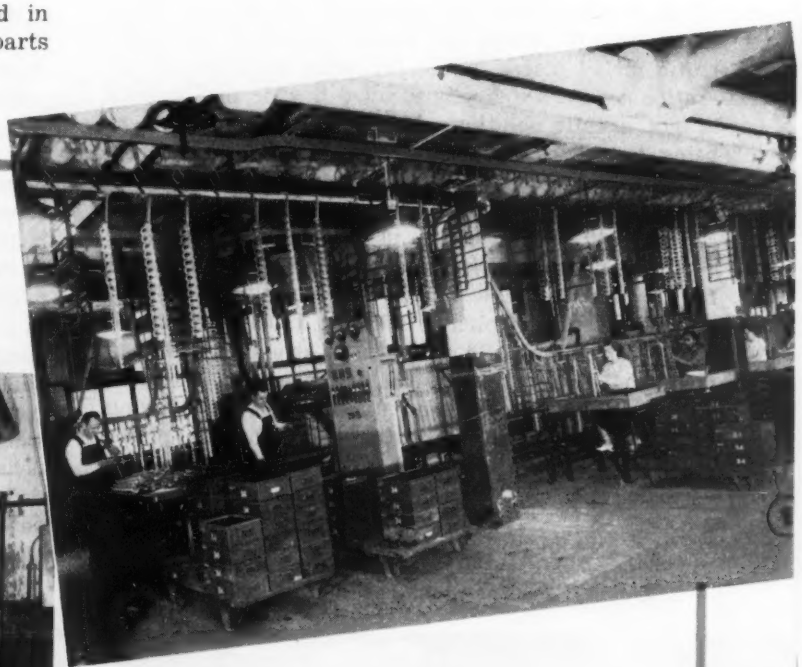


Fig. 3—Typical return dwell type automatic zinc plater with conforming anode racks suspended from one of the plating arms

Fig. 4—Rotopickling and roto barrel plating units and power-board with ampere-hour meters

Fig. 5—One of the acid dipping units

Fig. 6—Automatic nickel and chromium platers

and chromium to avoid contamination of the plating baths that results in serious plating difficulties. This arrangement also permits greater flexibility in case of design changes. Nickel plating solutions are filtered continuously and slurry or mixing tanks are employed in conjunction with the filtering units.

A solution purification tank equipped with sheet metal saw tooth cathode is located in the filtering line. Current to this tank is supplied by a rectifier to give 3-5 amp per square foot. Copper, lead and zinc impurities are deposited at the lower current density range; iron is deposited at the higher current density range. A recent routine spectrographic analysis of the nickel bath indicated only traces of the above impurities. A separate circulating system channels the nickel plating solution through an external carbon type heat exchanger that maintains a constant temperature of 130° F.

Polyvinyl chloride tank lining is used in both the main nickel and chromium plating tanks. Current is supplied to the nickel tank by rectifiers equipped with manual controls. The company is doing some work with deionized make-up water for both the nickel and chromium plating baths. It is possible that in areas where the water is harder than Lake Michigan water (8 grains), significant plating improvements might be noted sooner.

Fig. 6 illustrates our automatic nickel and chromium platers. Parts are nickel plated in the automatic nickel plater in the following sequence of operations: (1) Anodically cleaned 6 v dc in 8 ounces of hot caustic solution; (2) cold water sprayed on being lowered and raised from all rinse tanks; (3) pickled at room temperature in concentrated noninhibited hydrochloric acid. Pickling is supplemented by 4½-v ac for 50 seconds using carbon electrodes; (4) cold water sprayed and soak rinsed; (5) plated for 20 minutes in a Watts type bath 32-6-4 ounce per gallon, pH 2.5 plus or minus 0.5; (6) rinsed and sprayed twice in cold water; (7) dried in a drying operation similar to the one described for use with zinc automatic platers and unracked at the loading and unloading position of the plater by the plater operator; and (8) reracked on the magnet rack for chromium plating.

Fig. 7—First operation in the automatic sequence is racking. Typical racking position is shown here

Condition of Solutions—Chromium plating solutions are continuously circulated by means of a centrifugal pump. A temperature of 130° F is automatically maintained by duplex temperature controller using 7 per cent tin-lead heating and cooling coils installed in the main plating tanks. A rinse recovery tank is installed after the main plating tank and functions as follows: Main chromium plating tank is equipped with a liquid level control. When the instrument calls for water additions, the make-up water enters the rinse recovery tank which discharges into the main plating tank until the latter operating level is reached. This, of course, is made possible by maintaining the level in the recovery rinse tank above the level of the plating solution. Plating current is supplied by an 8-v rectifier equipped with automatic voltage and current controls. Flat sheet lead anodes are employed.

An interesting variation of polystyrene tubes and rods was used for controlling the plating solution mist formed during normal plating. Instead of the shapes mentioned above, we are experimenting with a sphere that resembles a ping pong ball. Cyclone type moisture extractors are installed in the exhaust duct to control chromium acid discharge from stack.

Precleaning treatment of nickel plated parts prior to chromium plating is similar to that described for cleaning prior to nickel plating except that lower current densities are used. This pretreatment cleaning assures complete activation of the nickel deposit and improves coverage of the subsequent chromium deposit. Parts are plated for 18 minutes at 200 amperes per square foot to produce a chromium deposit of minimum 0.0001-inch thick in a standard chromium plating bath.

Measuring Plating Thicknesses—Plating thicknesses of nickel and chromium are measured by a standard cross-sectioning method. Sample parts are first plated with a light deposit of copper or wrapped in copper foil to provide a backing for the metal deposits. Next, parts are cut to reveal the plated finish in cross-section. The specimen is mounted in bakelite using a molding press, after which the specimen is ground to a smooth, scratch-free finish on the four-faced, two-wheel grinder. Four grades of emery paper, ranging from No. 1 to No. 000, are used. The specimen is finally polished with levigated alumina on a wet wheel, then etched with suitable reagents. This defines the edges of the separate deposits in sharp detail. Thicknesses of the plated deposits are measured with a plater's microscope, using a magnification of about 500 diameters and a filar micrometer eye-piece.

Bright zinc baths are maintained in a purified condition according to standard methods. A commercial brightener is added when necessary. Zinc plating solutions are analyzed once each 8-hour shift as a check on the daily addition of plating chemicals. The pH of zinc passivation solutions and nickel bath is checked once a day. Chromium and nickel baths are analyzed at least twice a week. Gravity of the chromium bath is checked daily. Plating solution control, current control and fixed plating areas in the plating baths insure a product that will consistently meet minimum thickness and appearance specification requirements.

Sixth WESTERN METAL CONGRESS and EXPOSITION

To Appeal to Western Industry

Metals for oil, chemical, aviation and mining industries are to be emphasized at the Los Angeles show, April 11-15. Over 100 papers are scheduled for the technical sessions. During the exposition 200 exhibitors plan to display equipment, supplies and metal processing methods of all types

ABOUT 200 nationally known firms are expected to display new and improved metals, welding and heat treating equipment, foundry supplies, inspection and testing devices, machining equipment and metal cutting tools at the sixth Western Metal Congress and Exposition in Los Angeles, April 11 through 15. To be held in Shrine Civic Auditorium, the event will place special emphasis on metals for oil, chemical, general manufacturing, aviation and mining production.

Held under the auspices of the American Society for Metals, the congress and exposition will have the cooperation of the western sections of 20 other national technical societies. These are expected to bring in an attendance of over 10,000 engineers and technicians who are members of the groups.

Five of the national technical societies will offer programs. These are: American Society for Metals, American Welding Society, American Foundrymen's Society, American Institute of Mining and Metallurgical Engineers and Society for Non-Destructive Testing. More than 100 papers on ferrous and nonferrous subjects will be delivered during the society meetings.

Technical sessions are to be held daily beginning at 9:30 a.m., 2 p.m. and 8 p.m., except Friday. No evening session will be held that day, but an additional session is scheduled for 4 p.m. Exposition hours during the first three days are noon to 10:30 p.m. On Thursday and Friday, the doors open at 10 a.m. and close at 6 p.m.

In addition to the regular daily technical sessions, subjects and authors of which are included here, three special educational programs have been arranged by the American Society for Metals. One on corrosion is planned for Tuesday morning, April 12; the second on metals for use at high temperatures is scheduled for Wednesday morning and afternoon; and the third, on the subject of metallography, will consist of four lectures on Monday, Tuesday and Wednesday evenings and Friday afternoon at 4 p.m.

The exposition and most of the technical sessions will be held in Shrine Convention Hall. Only the morning technical sessions of April 11, 12 and 13 will be presented in the Biltmore Hotel.

Following is the technical session program, including those papers to be presented at sessions of the American Society for Metals and the American Welding Society. Subjects to be covered at American Institute of Mining and Metallurgical Engineers and American Foundrymen's Society technical sessions are found on page 110. A calendar of exposition times, special events and technical sessions is found on this page.

HOURS AND PLACES OF MAIN EVENTS

EXPOSITION

Mon., Tues., Wed., April 11, 12, 13—12 noon to 10:30 p. m.
Thurs., Fri., April 14, 15—10 a. m. to 6 p. m.
Place—Shrine Convention Hall

TECHNICAL SESSIONS

Daily—9:30 a. m., 2 p. m., 8 p. m. (except Friday)
Fri., April 15—9:30 a. m., 2 p. m., 4 p. m. (no evening session)
Place— Shrine Convention Hall, except morning sessions, April 11, 12, 13, at Biltmore Hotel

DINNER-DANCE

Thurs., April 14, 8 p. m.—Biltmore Bowl

TECHNICAL SESSIONS

Monday, April 11, Morning

ASM TECHNICAL SESSION

"Precision Investment Casting," by A. W. Merrick, Austenal Laboratories, New York.

"Hardness Testing," by V. E. Lysaght, Wilson Mechanical Instrument Co., New York.

"The Surface Diffusion of Radioactive Silver on Silver," by R. A. Nickerson and Earl R. Parker, University of California, Berkeley, Calif.

AWS—AUTOMATIC WELDING

"Tandem-Arc Submerged-Melt Welding of Line Pipe," by Charles A. Babbitt, Cal-Metal Corp., Torrance, Calif.

"Automatic Welding of Pressure Vessels," by Clinton E. Swift, C. F. Braun & Co., Alhambra, Calif.

"Developments in Automatic Hard Facing," by H. W. Sharp, Stoody Co., Whittier, Calif.

April 11, Afternoon

ASM TECHNICAL SESSION

"A New Theory for the Solid State," by Carl A. Zapffe, consulting metallurgist, Baltimore.

"The Sigma Phase," by Francis B. Foley, Midvale Co., Philadelphia.

"Mechanical Properties and Efficient Designing With Magnesium," by George H. Found, Dow Chemical Co., Midland, Mich.

AWS—Welding Research

"Welded Ship Failures and Their Relation to Other Structures," by E. Paul DeGarmo, University of California, Berkeley, Calif.

"Brittle Fracture of Mild Steels and Heat Treated Alloy Steels," by Earl R. Parker, University of California, Berkeley, Calif.

"Recent Researches on the Metallurgy of Welding," by Alan E. Flanigan, University of California, Berkeley, Calif.

AIME TECHNICAL SESSION

April 11, Evening

ASM—METALLOGRAPHY

"Metallography of Aluminum Alloys," by Ray Bossert, Aluminum Co. of America, Vernon, Calif.

AWS—WELDING METALLURGY

Panel Discussion by C. B. Voldrich, Battelle Memorial Institute, Columbus, O.; E. R. Parker, University of California, Berkeley, Calif.; Alex Maradudin, Standard Oil Co. of California, El Segundo, Calif.; Alan E. Flanigan, University of California, Berkeley, Calif.; Donald S. Clark, California Institute of Technology, Pasadena, Calif.

Tuesday, April 12, Morning

ASM—CORROSION

"Fundamental Theories of Corrosion," by Richard Pomeroy, Montgomery and Pomeroy, Pasadena, Calif.

"Corrosion Problems in Light Alloys," by Roy E. Paine, Aluminum Co. of America, Los Angeles.

"Corrosion Protection of Refinery Equipment," by Henry P. Zeh, Standard Oil Co. of California, San Francisco.

AWS—ELECTRODES, CUTTING AND BRAZING

"Electrodes, Their Coatings and Influences," by John J. Chyle, A. O. Smith Corp., Milwaukee.

"Arc-Air Cutting and Gouging," by Myron D. Stepath, Puget Sound Naval Shipyard, Bremerton, Wash.

"Strength of Silver-Brazed Joints," by A. M. Setapen, Handy and Harman, New York.

April 12, Afternoon

ASM TECHNICAL SESSION

"Metallurgical Problems in Drilling and Petroleum Production," by Morton Spar and G. W. Whitney, Emsco Derrick & Equipment Co., Los Angeles.

"Fractographic Structures in Weld Metal," by Carl A. Zapffe and C. O. Worden, consulting metallurgists, Baltimore.

"Some Factors Affecting Behavior of Steel During Cold Working," by Harold K. Work, New York University, College of Engineering, New York.

AIME TECHNICAL SESSION

SNDT—AUTOMOTIVE INDUSTRY AND RAILROAD SESSION

April 12, Evening

ASM—METALLOGRAPHY

"Metallography of Copper Alloys," by Harry P. Croft, Wheeling Bronze Casting Co., Moundsville, W. Va.

AWS—WELDING DESIGN CLINIC

Panel Discussion by E. Paul DeGarmo, University of California, Berkeley, Calif.; M. H. MacKusick, consulting engineer, Los Angeles; F. J. Pilia, Linde Air Products Co., Newark, N. J.; R. T. Gillette, General Electric Co., Schenectady, N. Y.

SNDT—AIRCRAFT INDUSTRY AND MANUFACTURING CONTROL

Wednesday, April 13, Morning

ASM—HIGH-TEMPERATURE METALS

"Chromium-Iron and Chromium-Nickel-Iron Alloys for High-Temperature Service in Petroleum Refineries," by E. E. Thum, editor, *Metal Progress,* Cleveland.

"General Review of Development of High-Temperature Alloys for Jet Engines," by Roger Long, National Advisory Committee for Aeronautics, Cleveland.

"Refractory Metals, Such as Molybdenum, Zirconium, Tungsten, Tantalum, for Ultra-High Temperature Service," by Earl R. Parker, University of California, Berkeley, Calif.

AWS—INERT-GAS-SHIELDED ARC WELDING

"The Application of Inert-Gas Arc Welding to Airframes and Engines," by Tom E. Piper, Northrop Aircraft, Hawthorne, Calif.

"Welding With the Aircomatic Process," by E. H. Roper, Air Reduction Sales Co., New York.

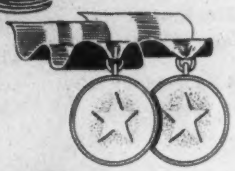
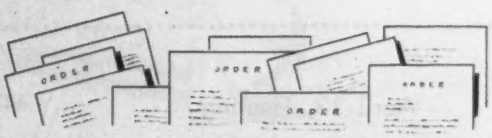
"Heliarc Welding in Production," by F. J. Pilia, Linde Air Products Co., Newark, N. J.

April 13, Afternoon

ASM—HIGH-TEMPERATURE METALS

"Formability of Various Alloys for High-Temperature Service Appilcations," by J. F. Tyrrell, Solar Air-

Whitey sez:

Maurath arc-welding electrodes are built carefully to do the job. They do their work well  every day all over the world. They meet the most exacting and rigid requirements, are delivered promptly, and warrant repeat orders  on the strength of their own performance

ALL STAINLESS AND HEAT RESISTING ARC WELDING ELECTRODES STOCKED. ALSO ELECTRODES TO MEET SPECIFIC ANALYSES. COMPLETE FACILITIES FOR COLD DRAWING, ROLLING, PICKLING AND ANNEALING

MAURATH, INC. 21800 MILES AVENUE CLEVELAND 22, OHIO

craft Co., San Diego, Calif.

"A Cobalt-Base Sheet Alloy for High-Temperature Service," by W. O. Binder and H. R. Spendelow Jr., Union Carbide and Carbon Research Laboratories, Niagara Falls, N. Y.

"Metallurgical Considerations in the Application of Nuclear Energy for the Propulsion of Aircraft," by Walter J. Kozhuba, NEPA Project, Oak Ridge, Tenn.

AWS—NONFERROUS WELDING

"New Developments in the Welding of Aluminum," by C. B. Voldrich, Battelle Memorial Institute, Columbus, O.

"Welding of High-Nickel Alloys," by Kenneth M. Spicer, International Nickel Co., New York.

"Resistance Welding of Nickel Alloys," by Frank G. Harkins, Solar Aircraft Co., San Diego, Calif.

SNDT—OIL TOOL MANUFACTURING AND OIL TOOL SERVICE

Thursday, April 14, Morning

ASM TECHNICAL SESSION

"Metals for Use at Low Temperatures," by S. L. Hoyt, Battelle Memorial Institute, Columbus, O.

"Recent Developments in Strain Measurement," by William T. Bean Jr., consultant, Detroit.

"The Fabrication of Stainless Steels," by Bernard Gross, Rohr Aircraft Corp., Chula Vista, Calif.

AWS—RESISTANCE WELDING

"Resistance Welding — History, Design, Control and Application," by Robert T. Gillette, General Electric Co., Schenectady, N. Y.

"Some Developments in Resistance Welding Controls," by Eugene Lica, Douglas Aircraft Co., Santa Monica, Calif.

"Three-Phase Resistance Welding Machinery," by J. H. Cooper, Taylor-Winfield Corp., Warren, O.

AIME TECHNICAL SESSION
AFS TECHNICAL SESSION

April 14, Evening

Dinner-Dance-Entertainment at Biltmore Bowl.

Friday, April 15, Morning

ASM TECHNICAL SESSION

"Ferritic Low-Alloy Boron-Titanium Steel for Use at Moderately High Temperatures," by G. F. Comstock, Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

"Testing," by Arthur E. Focke, Diamond Chain Co., Indianapolis.

"Materials Required for Design of High-Speed Airplanes," by T. E. Piper, Northrop Aircraft, Hawthorne, Calif.

AWS—CODES, SAFETY, INSPECTION

"Recent Changes in Pressure Vessel Codes," by Elmer O. Bergman, C. F. Braun & Co., Alhambra, Calif.

"Proposed Code for the Control of Hazardous Substances," by George A. Sherman, California State Division of Industrial Safety, San Francisco.

"Nondestructive Testing of Welded Refinery Equipment," by S. F. Artese, Shell Chemical Co., Wilmington, Calif.

Papers for four AIME sessions:

"The Nature and Control of Emissions From the Stack of the Common Cupola," by John F. Drake, Kennard & Drake, Arcadia, Calif.

"A Mathematical Approach to the Prediction of the Mechanical and Chemical Properties of Metal Alloys," by Pol Duwez, California Institute of Technology, Pasadena, Calif.

"Temper Brittleness of a Nickel-Chromium Steel," by H. P. Nielsen, University of Southern California, Los Angeles.

"Metallurgical Problems Confronting the Development of Atomic Energy," by John P. Howe, Knolls Atomic Power Laboratory, U. S. Atomic Energy Commission, Schenectady, N. Y.

Papers for two AFS sessions:

"Nodular Graphite in Cast Iron," by E. K. Smith, consulting metallurgist, Los Angeles.

"Steel Castings and Their Place in Fabricated Products," by W. A. Saylor, and L. A. Pattison, Consolidated Steel Corp., Los Angeles.

April 13, Evening

ASM—METALLOGRAPHY

"Metallography of Carbon and Low-Alloy Steels," by Wilbur R. Varney, California Institute of Technology, Pasadena, Calif.

AWS—AIRCRAFT WELDING

Panel Discussion, by Tom E. Piper, Northrop Aircraft, Hawthorne, Calif.; Frank G. Harkins, Solar Aircraft Co., San Diego, Calif.; Charles E. Smith, Douglas Aircraft Co., Long Beach, Calif.; Fred Pipher, Lockheed Aircraft Co., Burbank, Calif.; Bert Gross, Rohr Aircraft, Chula Vista, Calif.

AFS TECHNICAL SESSION

AIME TECHNICAL SESSION

April 14, Afternoon

ASM TECHNICAL SESSION

"Revealing the Grain Structure of Common Aluminum Alloy Metallographic Specimens," by L. J. Barker, Permanente Metals Corp., Trentwood, Wash.

"The Tensile Impact Properties of Some Metals and Alloys," by D. S. Clark and D. S. Wood, California Institute of Technology, Pasadena, Calif.

"Stainless Steels for Special Services," by V. N. Krivobok, International Nickel Co. Inc., New York.

April 15, Afternoon

ASM TECHNICAL SESSION

"Fatigue of Metals," by Francis G. Tatnall, Baldwin Locomotive Works, Philadelphia.

"Wrinkles in Heat Treating," by G. B. Berlien, Industrial Steel Treating Co., Oakland, Calif.

"Influence of Carbide-Forming Elements on Underbead Cracking of Low-Alloy Steel," by R. S. Stewart and S. F. Urban, Titanium Alloy Mfg. Div., National Lead Co., Niagara Falls, N. Y.

"Boron Treated Steels," by John Lawless, metallurgist, Plomb Tool Co., Los Angeles.

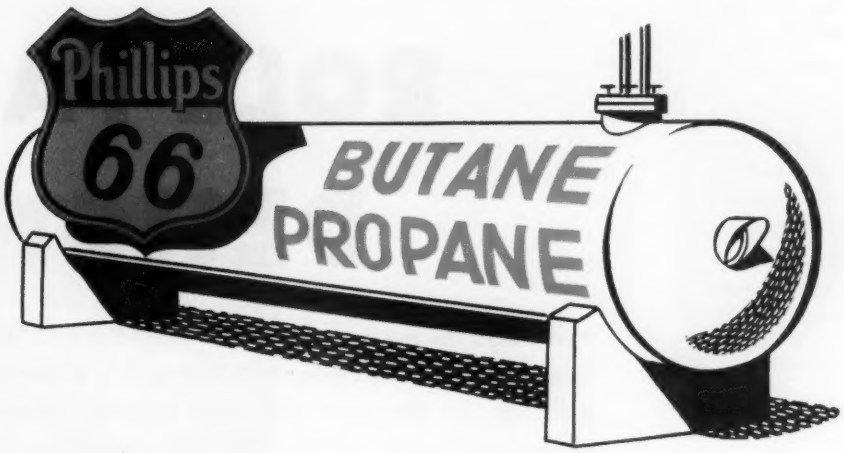
SNDT—PETROLEUM REFINING AND SONIC TECHNIQUES

April 15, 4:00 P.M.

ASM—METALLOGRAPHY

"Metallography of the Stainless Steels," by Keith F. Finley, Northrop Aircraft, Hawthorne, Calif.

(Please turn to Page 126)



Stand-by GAS

OR CONTINUOUS SUPPLY

Efficient, economical Phillips LP-Gas and Phillips designed LP-Gas systems assure you of continuity of operation either during emergency or peak load periods. You are also assured of a dependable supply for year-round operation if desired. Our strategically located, experienced LP-Gas engineers will gladly study your requirements and make reliable specific recommendations. Get in touch with our nearest district office.

Specialists in
LP-GAS *Engineering*

PHILLIPS PETROLEUM COMPANY

Philgas Division — SALES DEPARTMENT — Bartlesville, Oklahoma

District Offices in NEW YORK • CHICAGO • PHILADELPHIA • DETROIT
ST. LOUIS • MILWAUKEE • KANSAS CITY • ATLANTA • SHREVEPORT • TULSA
DENVER • AMARILLO • MINNEAPOLIS • WICHITA • INDIANAPOLIS • DES MOINES

FUNDAMENTALS of STEELMAKING

NUMBER 5 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

The Art of

ROLL PASS DESIGN

Years ago the art was shrouded in secrecy and passed on only to male descendents of the designer. Today it is practiced by men who have a faculty for the work and have acquired a rounded experience by designing a large number of sections covering a wide range of profiles

By ROSS E. BEYNON
Superintendent, Roll Department
South Chicago Works
Carnegie-Illinois Steel Corp.
Chicago

ROLL DESIGN may be said to have had its inception in 1775 about the time Henry Cort built his mill in Fontley, England. In this mill grooved rolls were first used in the reduction of puddled iron blooms to bars of varied cross-section. Cort secured a patent on this rolling process in 1783-1784.

Previous to this time bars were hammered to size on water driven tilting hammers used during this period. Rolling of bars created a demand for men to learn and acquire skill and experience in this new and useful art.

Rolling practices and pass designs of the period following Mr. Cort's successful experiments were kept as closely guarded secrets by plant owners and skilled workmen and knowledge of this new art was slow to spread.

Pass forms of the time consisted of gothic shaped grooves, so called box passes, tongue and groove flat passes, and round grooves.

Mills of this early period were of the two-high pull-over type where bars, after completion of each pass through the rolls, were returned to the entering side by being pulled and pushed over the top roll. These early mills were driven by waterwheels and during periods of low water could not operate. Fig. 2 shows a mill built around 1812 and it will be noted that the simple roll pass design shows formations called gothic roughing stand grooves and flat tongue and groove finishing passes.

Although British steel manufacturers tried to keep their successful rolling operations to themselves, European manufacturers hired their operators and roll turners and built new mills in Germany, Belgium, and France, and thus basic knowledge of puddling and rolling became more general.

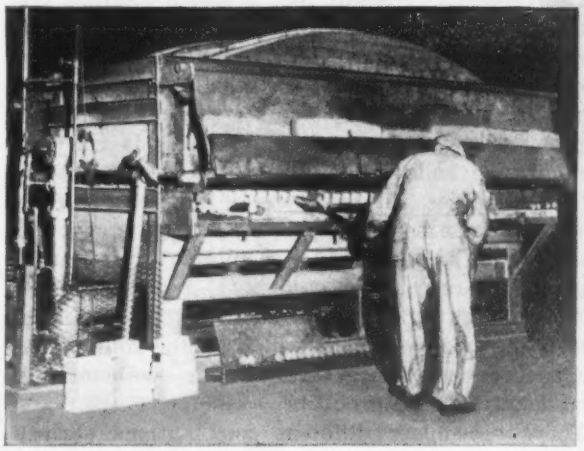
Roll design was handled at first by mill operators but as time went on and operations increased this work was turned over to men who devoted their entire time to designing.

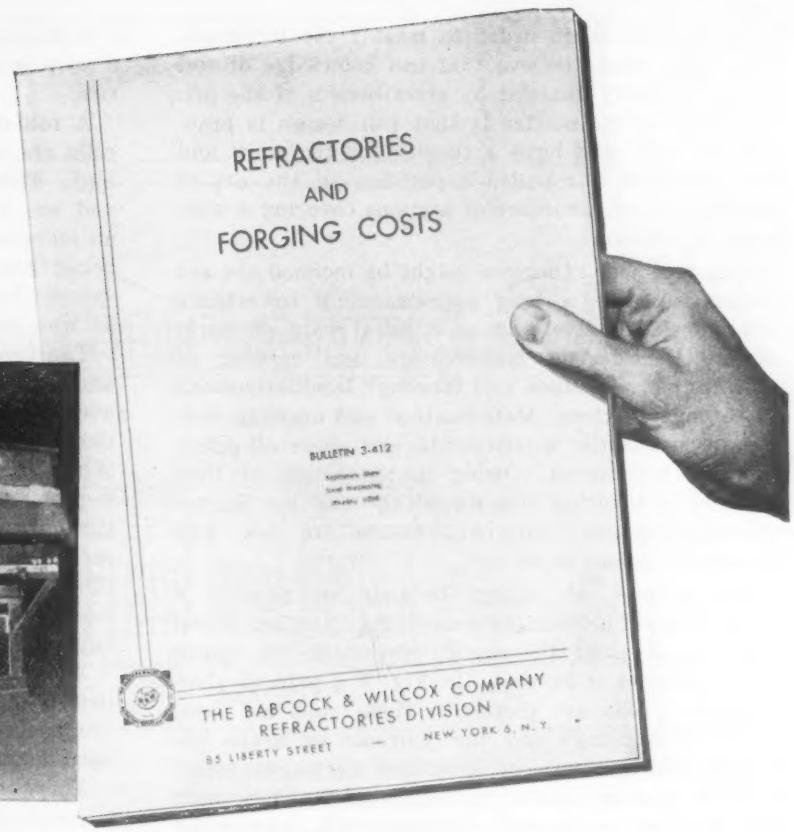
Rolling at first was confined to bars, but beginning in 1819 simple shapes were rolled, angles first, then tee shaped rails, zee bars, tees, and about 1848, beams and channels.

Early secrecy in rolling mill operations confined the practice of roll designing to a few skilled men who preferred to keep their knowledge to themselves and their male descendants. Even to this day in Britain, instances are known where the third and fourth generation of families were and are roll designers. It was owing to these family attempts to keep roll designing technique confined that the impression was given that to be a roll designer it was essential to be born into a roll designing family or

The author's first business experience, at the age of 12, was working part time on the rolls of a bar mill. Further experience was gained on rod and light rail mills. His father was a roller and roll turner and Mr. Beynon worked under him both turning rolls and operating the mills. His technical education was obtained by home study in mechanical engineering. During this time he worked as a draftsman and did roll designing for new bar and light rail mills.

He later came to South Works of Carnegie-Illinois Steel Corp. as a roll draftsman, subsequently becoming assistant superintendent of the roll department. In 1931, he was appointed superintendent of the roll department, a position he holds at the present time. He has had vast experience with rod and bar mills, rail mills, structural and plate mills.





FORGING FURNACE OUTPUT

Increased 40%

A new bulletin, available to you on request, provides facts and figures which may well help you achieve significant savings in producing forgings by reducing costs of furnace operation.

IT TELLS HOW:

- **The cost of producing forgings has been reduced by as much as $2.27 per ton**
- **Production per sq. ft. of hearth area has been increased up to 40%**
- **Fuel consumption — down 30% to 75%**
- **Heating up time — reduced by as much as 83%**
- **You may get up to 300% longer service life from forge furnace linings**

It tells *why* these savings are possible . . . through the use of B&W Insulating Firebrick.

Write today for your copy of BULLETIN 3-412

B&W

B&W REFRACTORIES PRODUCTS

B&W 80 FIREBRICK • B&W JUNIOR FIREBRICK
B&W 80 GLASS TANK BLOCKS • B&W INSULATING FIREBRICK
B&W REFRACTORY CASTABLES, PLASTICS AND MORTARS

•

OTHER B&W PRODUCTS

Stationary & Marine Boilers and Component Equipment
Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers
Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

ROLL PASS DESIGN

be a close friend in order to master the technique. Even today many believe that the knowledge of roll design is closely guarded by practitioners of the art. The truth of the matter is that roll design is practiced by men who have a faculty for the work and have acquired a rounded experience in the art of designing a large number of sections covering a wide range of shapes.

Most men who otherwise might be inclined are not willing to serve a long apprenticeship to acquire this knowledge involving as it does years of working at the design, manufacture and turning of all kinds of roll shapes, and thorough familiarity with all rolling practices. Mathematical and drawing ability are part of the requirements, and above all determination to succeed. Owing to the length of time required in securing this knowledge and the limited opportunities for learning, there are few men thoroughly versed in the art.

The process of rolling consists of passing a piece of metal between two revolving cylinders called rolls, compressing the metal, increasing its length while reducing it in area. In Fig. 3 a pair of plain cylindrical rolls are pictured. These rolls are positioned in housings and the journals or necks are supported by bronze or babbitted carriages which hold the rolls in position as they revolve. These rolls may be plain, as shown, or turned with grooves for the production of bars or shapes. The drawing shows a rectangular bar being reduced in the rolls. This is a very simple illustration of the basic rolling practice.

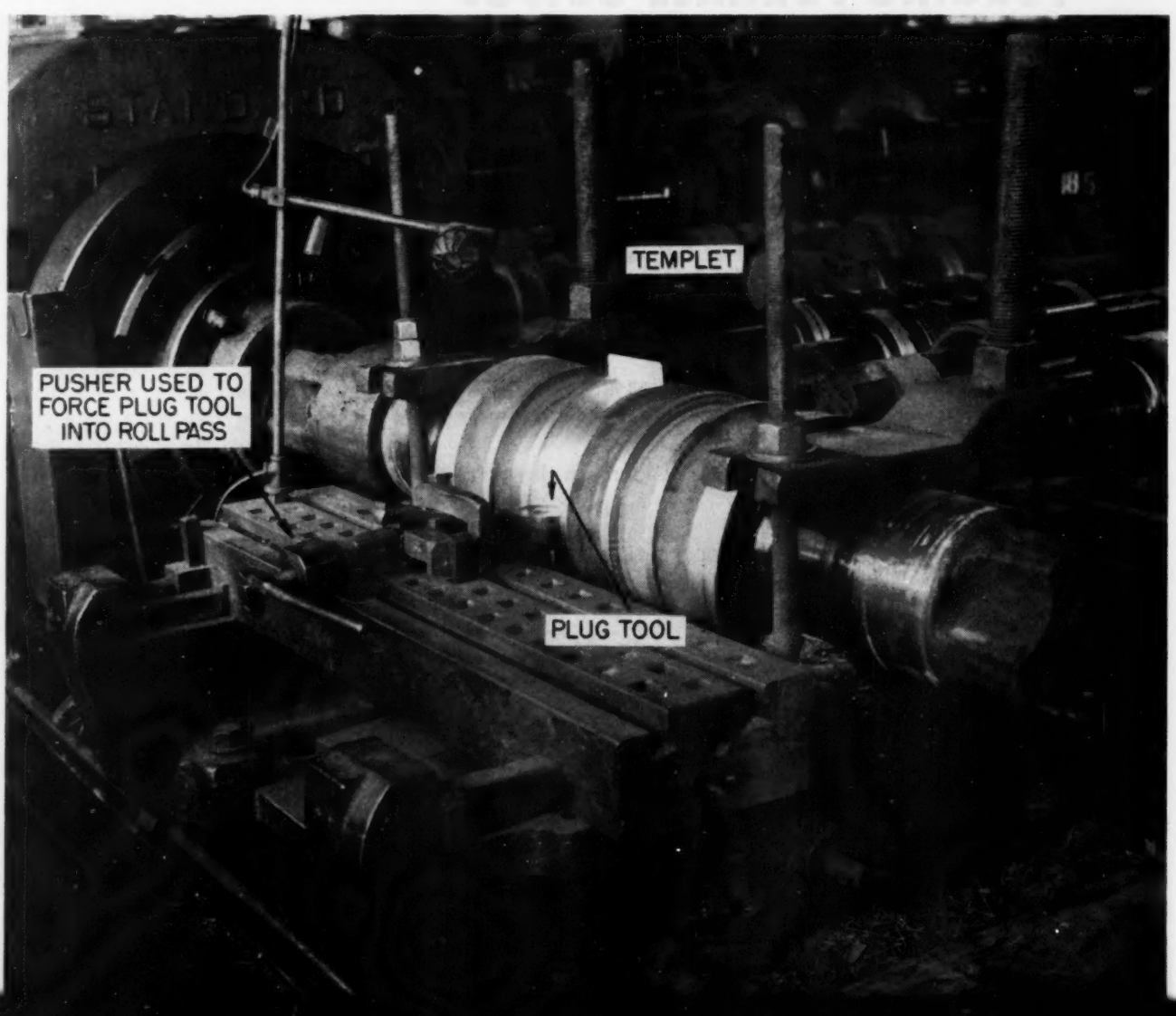
A roll stand may contain two rolls, and when two rolls are used, as in the illustration, it is called two-high. Three rolls are also commonly used in a stand and are designated as three-high. Fig. 4-A shows an elevation of a three-high stand of rolls with bars being reduced. The three-high roll stand was developed to eliminate all idling back over the top roll as was necessary on the first simple two-high mills.

The two-high reversing mill is also a common type and was developed to avoid passing material back over the top roll of the first two-high mills. In practice a bar is run through the rolls in one direction. When the bar has completed its passage in this direction, rolls are reversed and the bar is run back through the rolls. This process is repeated for a series of passes. In this type of mill there are no idle passes as a bar after passing through a groove in one direction is passed back in another groove as the rolls are reversed.

A four-high mill is pictured in Fig. 4-B. In this design the two work rolls which do the rolling work are backed up by larger rolls. This combination is used mostly for flat products.

There are many different combinations such as

Fig. 1—Typical roll lathe turning a finishing roll for production of rounds



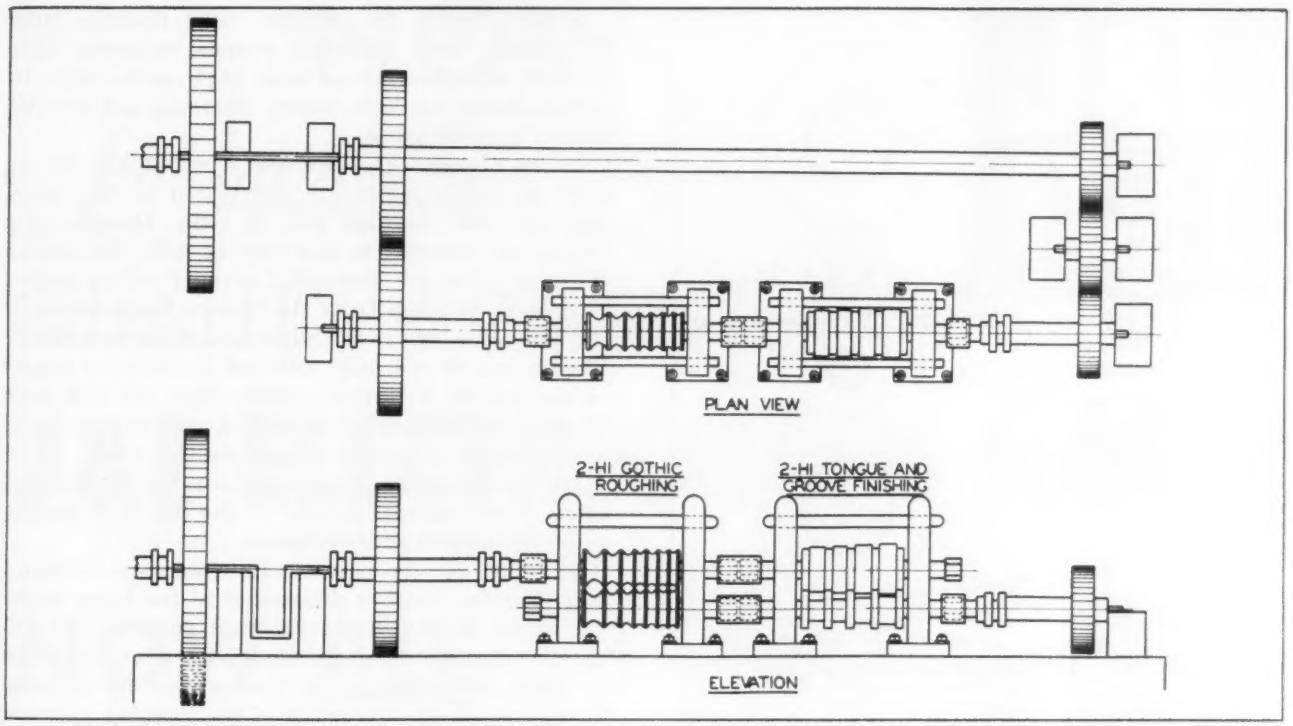


Fig. 2—English hand bar mill of 1812

cluster mills and others too numerous for mention. Two-high and three-high mills are the ones where roll design plays its most important part.

Before the advent of the rolling mill such bars as were produced were forged. In forging, bars were alternately turned 90 degrees on the anvil to reduce them in all dimensions, as forging the bar in one plane only produces considerable spread with relatively small elongation. In contrast to forging, rolling in one plane alone will produce far greater elongation than spread. In Fig. 5-A is shown a bar $2\,{}^{1}/_{32} \times 1\,{}^{1}/_{16}$ inches in cross section, and $12\,{}^{3}/_{16}$ inches long as it would appear after being heated and reduced in a press with full coverage from 2 to $1\frac{1}{2}$ inches thick. In Fig. 5-B is shown the same stock after having been rolled to $1\frac{1}{2}$ inches thick. In the pressed piece considerable spread as compared to the elongation is to be seen. In the rolled piece there is much more elongation than spread.

This illustration shows the greater effectiveness for quick reduction of the rolling operation as compared to pressing or forging. Before Cort's mill was introduced it took a forge plant a week to produce what the mill could do in a 12-hour turn.

Roll designer's problem in the development of bars and shapes is to reduce a cast ingot into a desired finished profile. In so doing he must use to advantage the first and basic principle of rolling which is that hot material being rolled elongates and spreads in proportion to the applied draft.

This fundamental principle is one that must be thoroughly understood by a designer. To produce the required finished profile he must by skillful forming of grooves direct and control elongation and spread in such a way as to cause the metal to flow to fill roll grooves completely and produce finished bars or sections to the desired size. In doing this the various types of steel must be taken into consideration as they have different spreading characteristics;

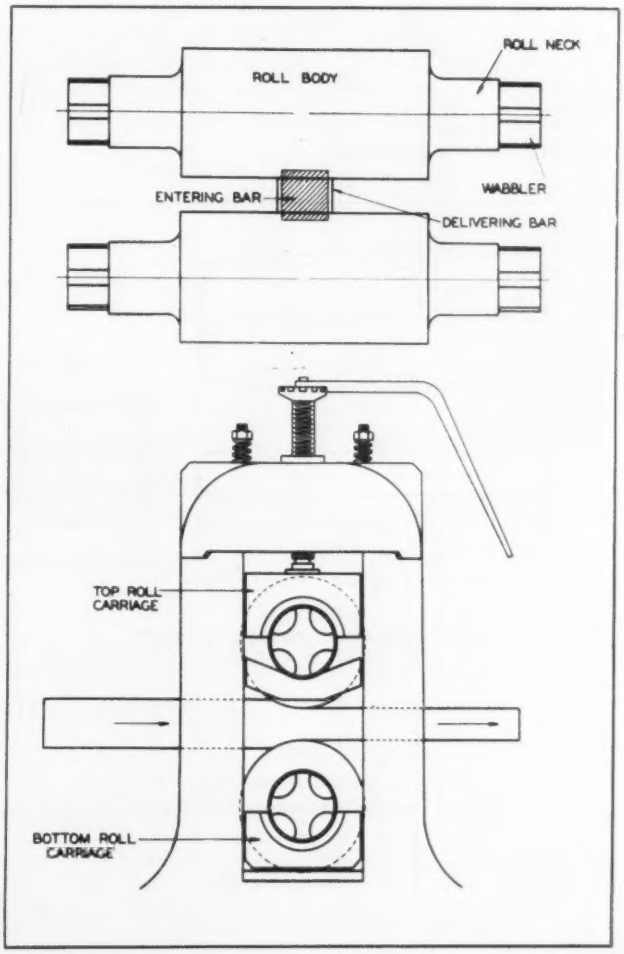


Fig. 3—View of two-high mill stand and pair of plain cylindrical rolls

ROLL PASS DESIGN

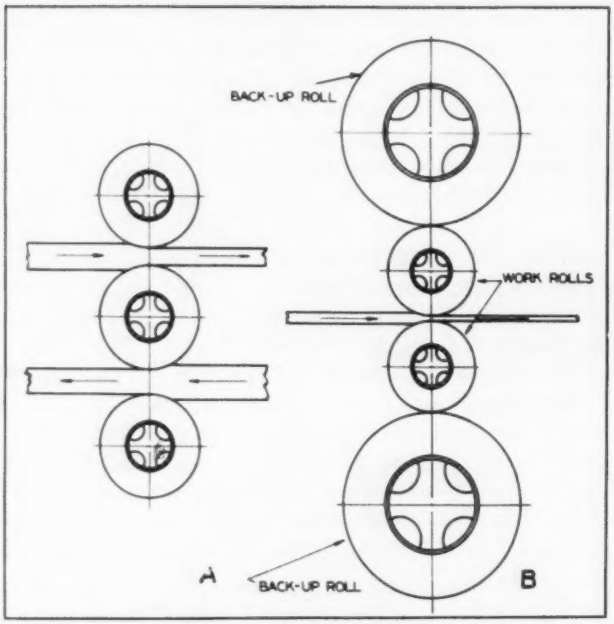


Fig. 4—Elevation of a three-high and four-high stand of rolls showing bars being reduced

some spread more than others and roll passes must be designed to allow for the varied spread.

In the limited scope of this article it is impossible to go into any great detail in explaining the various steps which are taken by a designer to produce the desired sections.

There are many different profiles produced and in each one there are several pass forms which may be employed. Mill layout on which the design is to be used sometimes dictates the pattern the pass design will take, as the soaking pits, heating furnaces, mill size, and number of stands, etc., may limit the designer's opportunities.

Sections which the designer must produce range from rods, bars including rounds, squares, flats, through sections such as rails, angle splice bars, tie plates, angles, zee bars, beams, channels, and a multitude of special shapes.

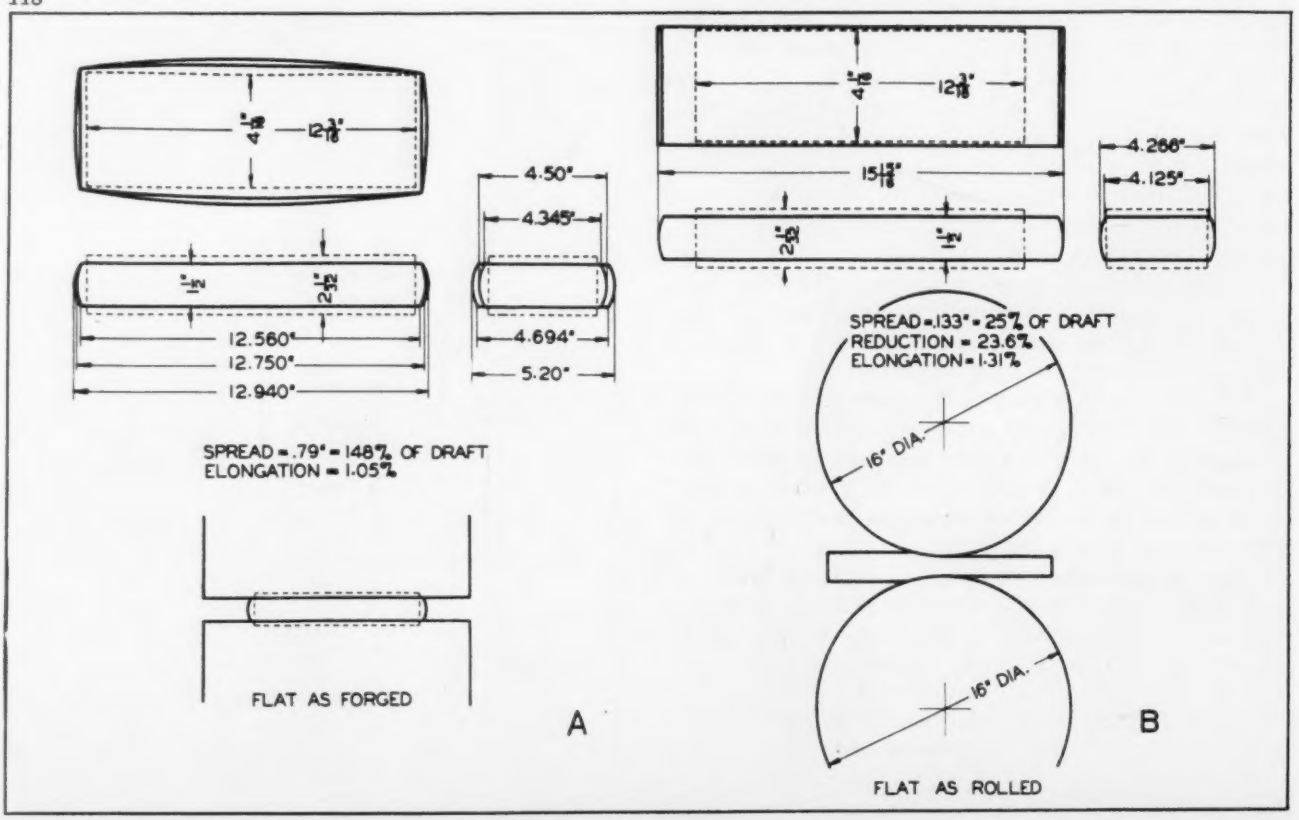
As an example Fig. 6 shows a roll design for an angle in which passes are distributed in two three-high and one two-high sets of rolls. Designs such as this are common to this type of mill. The design shown is called the "butterfly" style of rolling angles. This name is taken from the fancied resemblance of the flared out legs of the angle to a butterfly's wings. This is one of the most efficient designs for angles as the section is formed rapidly from the slab used as stock, permitting a fast rolling rate and produces a fine section at a good hourly tonnage rate.

As another roll design example, Fig. 7 shows a train of roll stands, similar to the one just shown, which are used to produce beams.

In laying out the passes a finishing pass is drawn first from the finished dimensions of the beam which are found in any structural steel company's handbook. In designing this finishing pass, allowance must be made for shrinkage of the hot bar as it cools. In most cases all dimensions of the finishing pass are calculated for a shrinkage of 1/64-inch to the inch, which is the allowed shrinkage. After the finishing pass is developed preceding passes are drawn, according to the best judgment of the roll designer, to the first shaped pass which is to roll the bloom provided for stock.

After all passes have been developed, full size steel templets are made of each pass and subsequently used in turning the rolls. Skilled workmen, called templet filers, do this work for which very close tolerances are required. After templets are finished and

Fig. 5—Comparison between rolled and forged flats

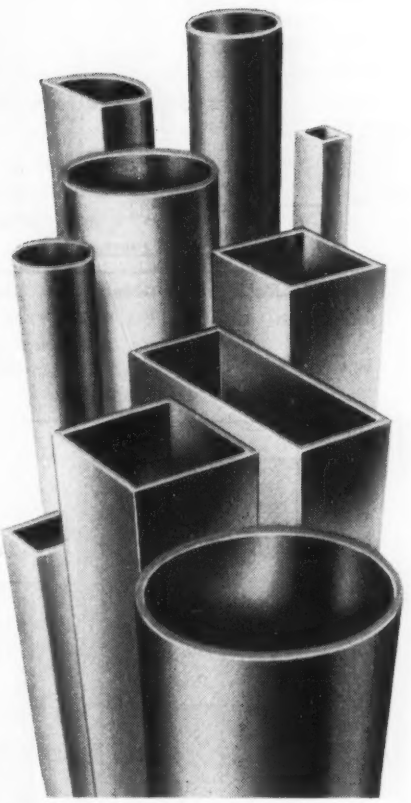


NOW
for immediate shipment

J&L STEEL

QUALITY CONTROLLED
J&L ELECTRICWELD tubing

NOW ALL SHAPES AVAILABLE!



You've asked for J&L *Electricweld* Tubing in shapes. Now you can get them in a wide range of sizes—squares, rectangles, ovals and other special shapes.

USE the structural advantages of J&L Electricweld Tubing to strengthen and lighten the weight of your products.

USE the quality-controlled surface of J&L *Electricweld* Tubing to obtain *better, smoother* finishes.

USE J&L's experience in tubing design and manufacture to help you select the best sections and to determine the most practical tolerances that will give you the lowest possible cost.

There's nothing more versatile than a tube. There's no tubing better than J&L *Electricweld* Tubing.

Let us send you the booklet: "J&L ELECTRICWELD TUBING *for more strength with less weight.*" The coupon is for your convenience.

Jones & Laughlin Steel Corporation
404 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me your booklet: "J&L ELECTRICWELD TUBING *for more strength with less weight.*"

NAME_____

COMPANY_____

ADDRESS_____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY (*hi-tensile steels*).

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

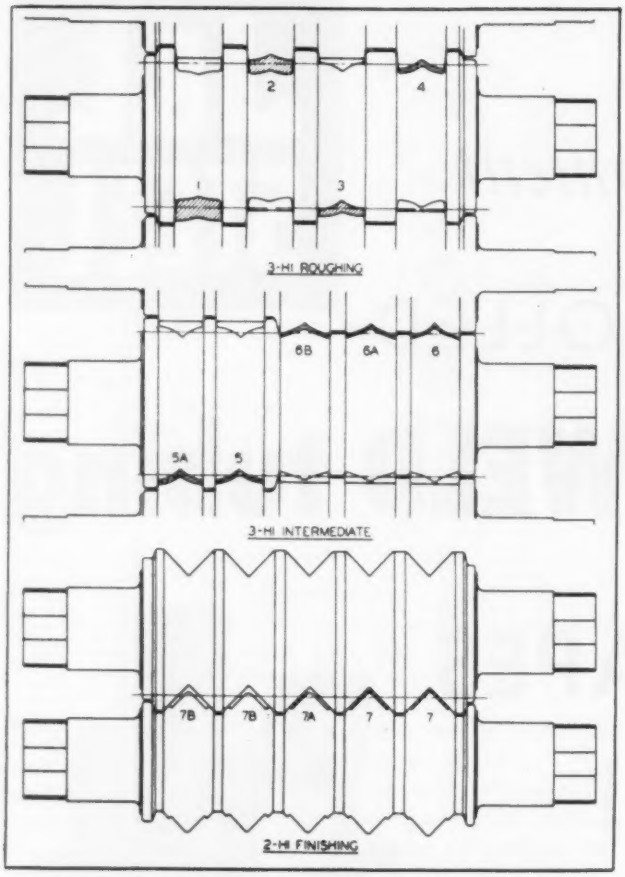


Fig. 6—Rolls and passes for producing 6 x 6-inch equal angles. This is referred to as the "butterfly" style of rolling angles

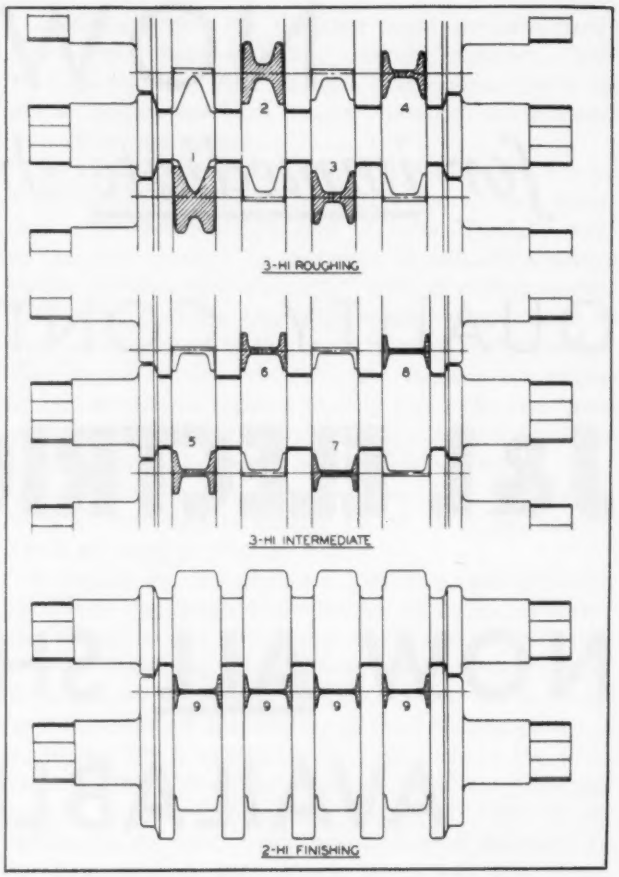
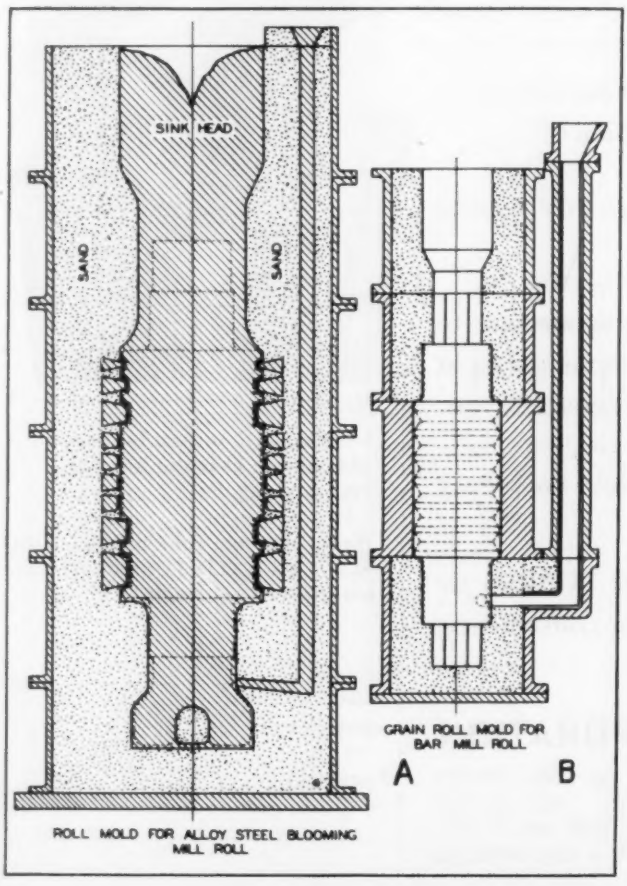


Fig. 7—Rolls and passes for producing 6 x 4-inch beams

Fig. 8—Roll molds used to cast blooming and bar mill rolls



thoroughly checked, roll drawings are made as a record, and for use of the roll turners while turning the rolls. Roll turning tools are ground to the templet size and the rolls are then turned to fit the templets.

In many plants the roll designer also designs pass guides and it is important that guide design be of the best, as many intricate sections could not be rolled without the aid of proper guides.

Fig. 9 shows a simple entering and delivery guide setup as used for a rectangular bar. In rolling more complicated sections it is necessary to provide guides which will closely fit and hold the bar in position on both entering and delivery sides.

Since the roll designer is responsible for roll design, it is also his responsibility to see that the section is one that can be rolled at a reasonable cost. He must be present at several of the first rollings of a new section to see that the rolling is satisfactory and, if not, make alterations in the rolls until a satisfactory section is produced.

Roll material which is used also plays an important part in successful rollings, and selection of the proper material is one of the roll designer's responsibilities.

There are two general classifications for roll material, iron and steel. In iron rolls there are many kinds available to suit almost any section. There is a plain iron casting called sand iron, a very common grade with very little or no alloy content. This type of roll is used very rarely as there are many

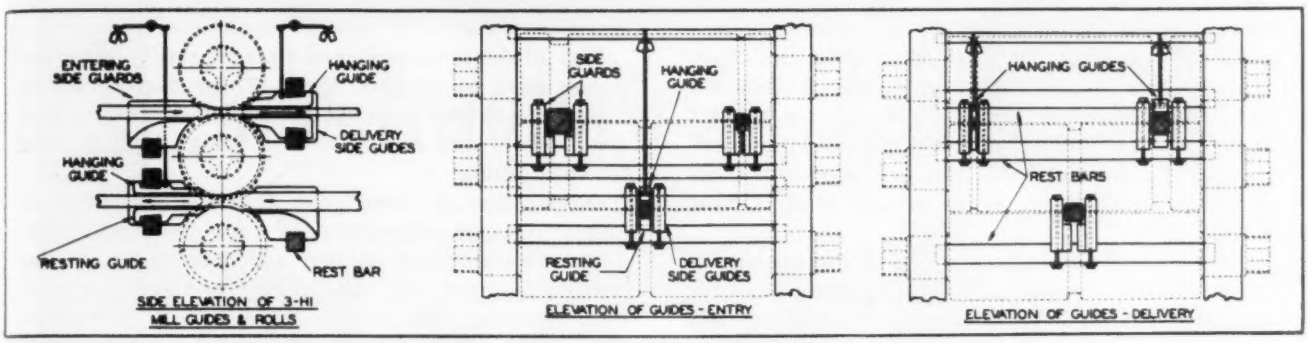


Fig. 9—Simple entering and delivery guide set-up as used on a three-high mill for rolling a rectangular bar

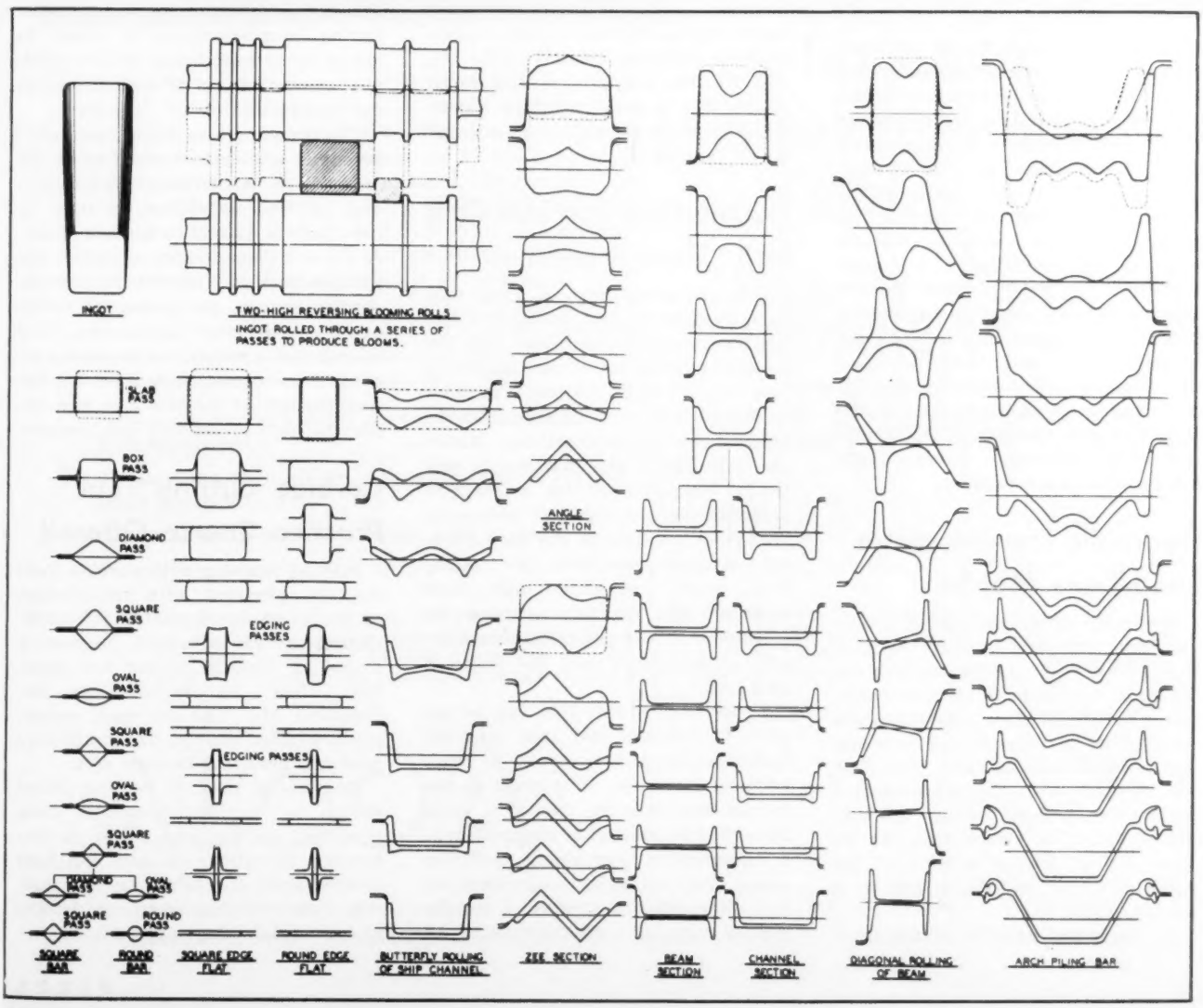
better grades available. There is a chill iron roll which is the commonest grade of hard surfaced roll. This type has a hard outer shell produced by using an iron mold for the roll body. The iron mold in direct contact with the hot metal chills and condenses the surface.

There are many other types of iron rolls such as the chill roll with alloy content, two grades of which are called nickel chill and nickel grain, and another type called "grain". The grain roll is used extensively for finishing rolls for bars and sections as it has a finely grained structure which affords good pass wear.

In the steel division there is first a plain carbon steel roll which in the past was used extensively for blooming mill rolls. There is also the alloy steel roll which has additions of nickel, chromium, molybdenum, and other alloys. This is the most popular of the steel base rolls and can be obtained very hard for finishing rolls or softer and stronger for roughing and blooming purposes. Space is too limited for a full description of all rolls and how they are made, but in Fig. 8 are shown two roll molds. A—depicts an alloy steel blooming roll mold and B—shows a grain finishing roll mold. These two sketches will give an idea of how rolls are cast.

A roll turner's part in the work is to turn rolls

Fig. 10—Roll pass development for producing various sections



to fit the templets from the roll drawings furnished him. A roll turning lathe is somewhat different from a machinists' lathe in that it is more solid and rigid. While roll necks are turned on centers, bodies are turned with the necks held in bearings for greater accuracy and rigidity. Fig. 1 shows a roll lathe turning a finishing round roll. The tool used is a piece of round called a plug. Work of this kind is most exacting.

The number of passes required to produce a section are fixed by the number of rolls, available space for passes and the size of bloom obtainable. The smallest number of passes which will produce a good section is the best design.

In roll pass design there are many things which must be considered by the designer such as roll diameters, roll speeds, heating capacity, and temperature at which the bar will be finished. Passes must be designed so that draft will be within the motive power capacity and in addition many other points too numerous to mention are involved in the design.

Completed and successful roll designs will represent the roll designer's skill acquired by years of study and experience.

Fig. 10 shows a number of finished profiles and the passes used to produce them. These designs range from rounds and squares, flats, angles, beams and channels, to and ending with a design that is used for sheet piling.

Observation of these pass drawings will give an idea of the tremendous scope of a roll designer's work.

The blooming mill design which is shown in the drawing's upper left hand corner is that of a two-high reversing mill with a screw-down. In practice an ingot such as the one shown is rolled through the various grooves, with several passes in each groove, altering the opening between the rolls at each pass. A design of this type will make any size of billet or slab from 3 x 3 inches and up, and is the most common and popular type in blooming mill use.

In conclusion, it may be said that while books can be written giving a large number of details regarding the art, ability in roll design is acquired by long experience and determined study.

Collets Feature Threads Ground After Hardening

Feeling that all surfaces of critical importance should be ground after hardening has led engineers of Wade Tool Co., Waltham, Mass. to specify that all collets made by the company should have their threads ground from the solid after hardening. This procedure is said to provide against any possible distortion in thread pitch or in thread shape, as well as eliminating distortion as to concentricity.

Use of the buttress thread, instead of the 60 standard V-thread, presents mating surfaces at right angles to the pulling force, thereby eliminating any expanding tendency. Maximum strength and security are attained, it is said, there being no overriding of screw threads. A collet seal reportedly entirely closes the slots and gives protection from chips and other materials which might otherwise create a problem.

Hydraulic Dynamometer Load-Tests Motors

Hydraulic dynamometers of a type designed, built and used by Wagner Electric Corp., St. Louis, are now being made available to electric motor repair shops and other establishments engaged in load-testing of motors. According to the company, tests that can be made with the dynamometer include idle, pull-in, pull-up, full-load and locked. The locked test can be made without having to shut off the motor to insert a locking pin or a similar device.

All tests are said to require very little effort on the part of the operator. The dynamometer is foot controlled, leaving both of the operator's hands free. Built to order only, the units are offered in three models: One of 30 foot pounds capacity has adapters for ½, ⅝, ¾ and 1-inch motor shafts; 30 to 300 foot pounds capacity with adapters for 1⅛, 1¼, 1⅝, 1⅞, 2⅛, 2⅜, 2⅝ and 2⅞-inch motor shafts; and a model which is a combination of the 30 and 30 to 300 foot pound machines.

Ductile Cast Iron Has Cast Iron, Steel Properties

Process advantages of gray cast iron, such as fluidity, castability and machinability, are combined with the product advantages of cast steel in a new engineering material described as ductile cast iron. Developed in the laboratories of International Nickel Co., New York, the material is said to be characterized by a graphite structure in the form of spheroids, free from graphite in the flake form. Its physical properties, particularly high elastic modulus, high yield strength and ductility, suggest its suitability for many applications hitherto considered beyond the scope of cast iron.

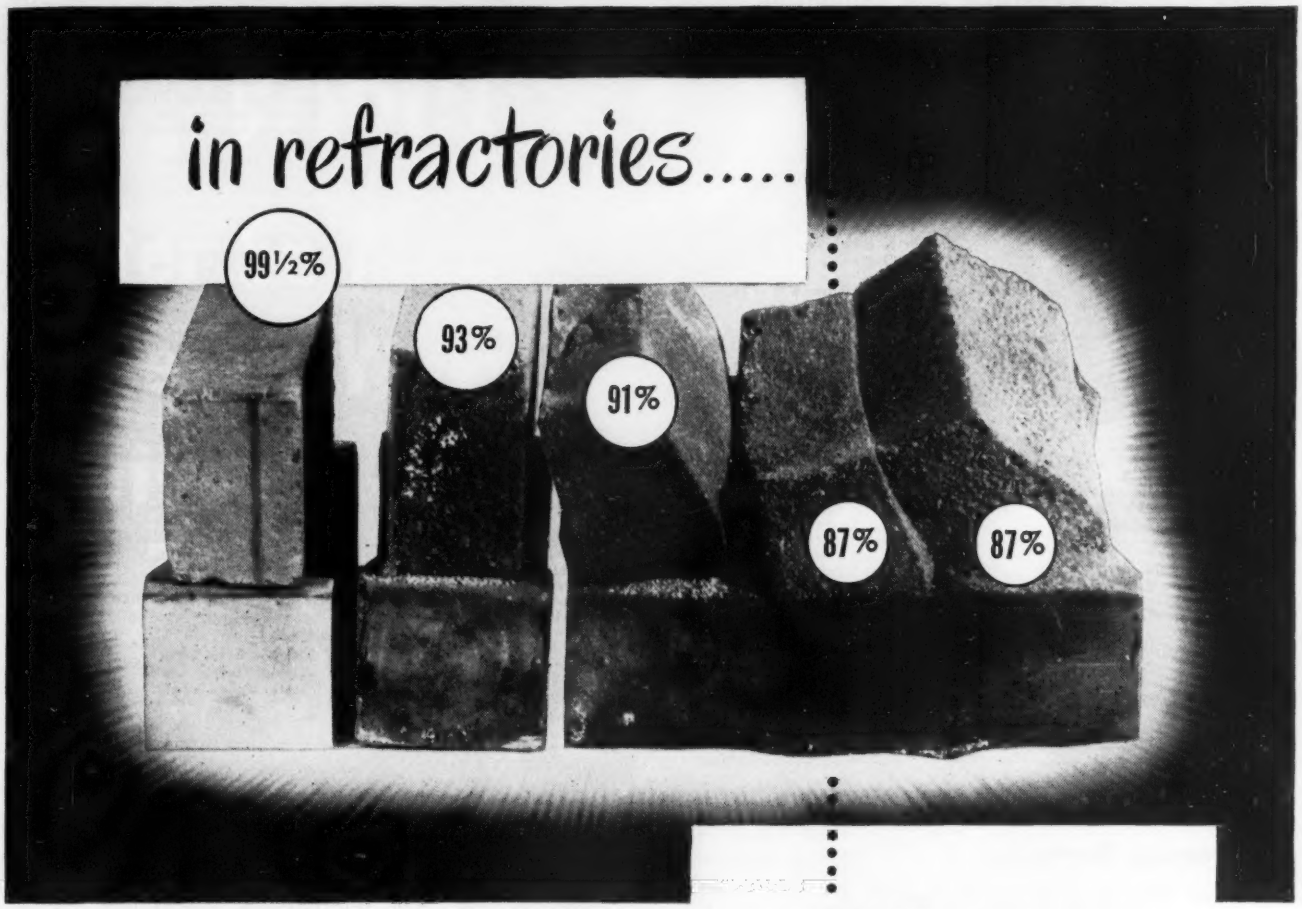
Production of this iron can be applied to common cast iron compositions melted in the cupola or other kinds of furnaces. It is based on the introduction into the iron of a small but effective amount of magnesium or a magnesium-containing addition agent, such as nickel-magnesium alloy. For pearlitic grades of cupola-melted material containing 3.2 to 3.6 per cent carbon and 1.8 to 2.8 per cent silicon, the ductile iron provides, in the as-cast condition, a combination of 85 to 105,000 psi tensile strength, with some ductility. Under stress it is said to behave elastically like cast steel rather than cast iron, having proportionality of strain to stress up to high loads, with a modulus of elasticity of 25 million pounds per square inch.

The company sees many and varied potential applications, such as in the automotive, agricultural implement and railroad industries. It may be used both in as-cast or in heat treated form in these industries and in the manufacture of machinery, crankshafts, pumps, compressors, valves and heavy industrial equipment. It is stated that a number of foundries already have arranged licenses for the manufacture of the new cast iron under the patent pending applications.

Carbide Cutting Tool Practice Course Offered

Anyone working with carbide tools may be provided with information on the latest developments and applications at an advanced instruction course in carbide cutting tool practice offered by Wendt-Sonis Co., Hannibal, Mo. The one week course, given without charge, has instructors who are practical factory men.

Equipment used is of the latest design in standard machine tools. Practical applications cover various turning operations on soft and heat treated steel, threading, boring, milling, counterboring, reaming drilling and everyday shop applications.



a little more Alcoa Alumina makes a "Whale of a Difference"

ALCOA Alumina increases stability and high-temperature resistance of refractories. This is clearly shown in the specimens illustrated above. All are alumina-content brick, and all were held at a temperature of *3400°F.* (Cone 40, flat) for four hours. From left to right, the alumina content of each brick is: 99½%, 93%, 91%, 87% and 87%. You can see what a "whale of a difference" a little extra ALCOA Alumina makes. (As temperatures and alumina content are decreased, similar results are obtained.)

Whatever your operating temperatures, you'll have less costly down time as a result of too-frequent refractory replacement, when you use alumina refractories. They give you these money-saving qualities:

- **Strength and stability under load at high temperatures.**
- **Resistance to spalling, abrasion and fluxing at high temperatures.**
- **Resistance to corrosive slags and gases.**
- **Negligible porosity and shrinkage.**

(Photo and data: Courtesy of Richard C. Remmey Son Co.)

Buy from your refractory manufacturer—You can buy brick and other shapes, containing various percentages of ALCOA Alumina to meet your requirements, from leading manufacturers. We'll gladly refer you to dependable sources of supply. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 1782 Gulf Building, Pittsburgh 19, Pa.

ALCOA

ACTIVATED ALUMINAS • CALCINED ALUMINAS • LOW SODA ALUMINAS • TABULAR ALUMINAS • HYDRATED ALUMINAS
ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE

Western Metal Congress and Exposition — *Concluded from Page 110*

EXHIBITORS

Acme Associates Inc.
Acme Blower & Pipe Co. Inc.
Acme Mfg. Co.
Air Reduction Pacific Co.
Air Reduction Sales Co.
Allen Mfg. Co.
Allison Co.
American Gas Furnace Co.
American Machine & Metals Inc.
American Steel & Wire Co.
American Wheelabrator & Equipment Corp.
Ampco Metal Inc.
Austenal Laboratories Inc.
Baldwin Locomotive Works
Barnes Co., W. O.
Bayer Co., A. J.
Beardsley & Piper Co.
Beets Co., Henry N.
Blakeslee & Co., G. S.
Bowman Chemicals Inc.
Brown Instrument Co.
Bruning Co. Inc., Charles
Bryant Heater Co.
Buehler Ltd.
Burg Tool Mfg. Co.
Carnegie-Illinois Steel Corp.
Cherry Rivet Co.
Clinton Machine Co. Inc.
Coffing Hoist Co.
Cold Metal Products Co.
Columbia Steel Co.
Commander Mfg. Co.
Crucible Steel Co. of America
Cyclone Fence Division
Dayton & Bakewell
Dayton Foundry
Dearborn Chemical Co.
Demmler & Bros., Wm.
Despatch Oven Co.
Detrex Corp.
Detroit Electric Furnace Division
Diamond Machine Tool Co.
Diversey Corp.
DoAll Co.
DoAll Western Co.
Dow Chemical Co.
Ducommun Metals & Supply Co.
Eclipse Fuel Engineering Co.
Edwards Inc., S. H.
Electro Refractories & Alloys Corp.
Erb and Gray
Eutectic Welding Alloys Corp.
Everede Tool Co.
Far-Best Corp.
Ferner Co., R. Y.
Freeman Co., C. E.
Gear Engineering & Mfg. Co.
General Metals Corp.
Gerrard Steel Strapping Co.
Hammond Machinery Builders Inc.
Handy & Harman
Hardinge Brothers Inc.
Harvey Machine Co. Inc.
Hastings Distributors
Haynes Stellite Co.
Hobart Brothers Co.
Houghton & Co., E. F.
Illinois Testing Laboratories Inc.
Immersion Heating Equipment Co.
Independent Foundry Supply Co.
International Nickel Co. Inc.
Janney Cylinder Co.
Kaiser Co. Inc.
Kelite Products Inc.
Kent Co. Inc.
Kenu Products Co.
Knapp Co., James H.
Kropp Forge Co.
Kuhlman Electric Co.
Leeds & Northrup Co.
Leekley-Hergenrather & Associates
L'Hommedieu & Sons Co., Charles F.
Lincoln Electric Co.
Lindberg Engineering Co.
Lindberg Steel Treating Co.
Linde Air Products Co.
Los Angeles Dept. of Water & Power
Los Angeles Steel Casting Co.
Magnaflux Corp.
Materials Service Co.
Milne & Co., A.
Minneapolis-Honeywell Regulator Co.
National Carbon Co. Inc.
National Supply Co.
National Tube Co.
Natural Gas Bureau
Natural Gas Equipment Inc.
North American Philips Co. Inc.
Norton Co.
Oakite Products Inc.
Ohio Crankshaft Co.
Pacific Industrial Mfg. Co.
Pacific Scientific Co.
Pacific Tube Co.
Pangborn Corp.
Partlow Corp.
Peck Steel & Die Supply
Perry Kilsby Inc.
Phelps Dodge Copper Products Corp.
Physicists Research Co.
Production Machine Co.
Revere Copper & Brass Inc.
Richards Co., J. A.
Riehle Testing Machine Division
Ryerson & Son Inc., Jos. T.
Sheldon Machine Co. Inc.
Simonds Saw & Steel Co.
Smith Corp., A. O.
Snyder Foundry Supply Co.
South Bend Lathe Works
Southern Calif. Metal Spinning Co.
Spar-Tan Engineering Co.
Spencer Turbine Co.
Standard Electrical Tool
Stuart Oxygen Co.
Superweld Corp.
Surface Combustion Corp.
Tempil Corp.
Tennant Co., G. H.
Texas Co.
Tinnerman Products Inc.
Tivit Products Co.
Tornquist Machinery Co.
Torrance Steam Cleaner Co.
Union Carbide & Carbon Corp.
U. S. Electrical Motors Inc.
United States Steel Corp.
United States Steel Supply Co.
Utility Steel Foundry
Vapor Blast Mfg. Co.
Victor Equipment Co.
Webster Engineering Co.
Welding Cable Headquarters
Welding Engineering Co.
Wells Inc., Martin
Wells Mfg. Co.
Western Machinery & Steel World
Westinghouse Electric Corp.
Whiting Corp.
Withrow Co., Arthur C.
Wyman-Gordon Co.
Yale & Towne Mfg. Co.

Many Factors Affect Life Of Storage Batteries

Factors that affect the life of lead-acid storage batteries of the type used in electric industrial trucks are: Rate of discharge, fully charged electrolyte gravity and operating temperature, according to H. D. Stanley of Gould Storage Battery Corp., Trenton, N. J. Serious harm will come to storage batteries if used past the point where the discharge curve falls rapidly, he asserted in a lecture given recently before the materials handling class in the Technical Institute of Fenn College, Cleveland.

Battery capacity decreases quite rapidly as temperature falls, necessitating use of larger batteries under conditions of low temperatures, such as in refrigerated rooms or outside during the winter months. Mr. Stanley also pointed out that if air temperature exceeds 110 to 115° F, battery life tends to be shortened. An overcharge of from 10 to 15 per cent will insure peak efficiency of a storage battery, he stated, but too much overcharge shortens the life expectency.

In selecting the proper storage battery for the particular job, factors to be considered are the distances involved, loads to be carried, ramps involved, amount of lifting and lowering and the number of fully charged replacement batteries available. In his introduction of Mr. Stanley, F. G. Teufel, Cleveland regional manager for Gould stated that today's job demands 100 per cent more work out of a storage battery than was required 20 years ago. He opined that today's trucks should be purchased with possible expanded uses in the future in mind, so that equipment is not unusable or overloaded several years after purchase.

Buy Best for Intended Use

Reports to the effect that the steel industry generally is buying cheaper equipment with a shorter life expectancy appear to be without foundation, according to a check of several leading companies. But, as one steel company president puts it, "We do not always buy the highest priced piece of equipment by any means, but do endeavor to purchase the best equipment for which it is intended."

Cast Nickel Alloy To Be Discussed at Meetings

Technical aspects of Ni-Resist, a cast nickel alloy having unusual combinations of engineering properties, will be discussed at a series of meetings sponsored by International Nickel Co., of New York, to be held in centrally located cities throughout the United States and in Montreal, Quebec. The alloy, which has the properties of resistance to corrosion and heat, good strength, good wear resistance and machinability and either high or low thermal expansion characteristics as desired, will have its applications in such fields as the aeronautical, automotive, chemical, machine tool, petroleum, and liquid handling discussed at the meetings.

F. G. Sefing, metallurgist of the Development and Research Division of International Nickel and Harold Larsen and F. L. Roewer of the company's sales department, will conduct the meetings. They will be held in Springfield, Mass., April 8, Philadelphia, April 15, Cleveland, April 22, Birmingham Ala., May 19, San Francisco, Calif., September 16, and Los Angeles, September 23.

Light Gage Steel Design Manual Published

Architects, designers and structural engineers will benefit from the use of a new manual, *Light Gage Steel Design Manual,* according to its publisher, the committee on building codes of the American Iron and Steel Institute, New York. Supplementing a 1946 institute publication, the manual includes design charts and the structural properties of structural members cold-formed.

Structural properties and other design information of seven basic sections are given, along with properties of these sections tabulated for sheet steel or strip of thicknesses from 0.135 to 0.048-inch, with nominal gage numbers from 10 to 18. Also included are design charts for light gage structural members in bending and under compression and effective design widths for load determination and deflection determination. Examples of practical design problems illustrate the use of tables and charts.

Only FORGINGS Offer So Many Sure Fire Ways to Obtain *Lower Costs* At The Point of *Assembly*

Macro-etch cross-section of Steering Lever forging shows how density of grain structure insures safety in operation of trucks and busses.

The maker of a Disc Clutch embodying this forged steel actuating lever increased the rate of machining two and one half times by having it forged.

A weight reduction of 22 per cent and a considerable saving in machining and finishing time was obtained by forging this Clutch Yoke used with an air-cooled gasoline engine.

This Sprocket forging weighs 18 lbs. less than the bar stock formerly required to produce it. Maker reports 40 per cent saving in machining and finishing time as result of forging to shape.

There are thousands of instances where forgings have reduced the cost of parts at the point of assembly. Forgings provide qualities and economies that are otherwise unobtainable. Forgings provide rapid assembly of complex parts by welding adaptability of widest range. Forgings permit reduction of dead weight because maximum strength and toughness are obtainable in lighter sectional thicknesses. Forging to shape avoids waste of metal and reduces machining and finishing time-cost. Forgings provide the strength and toughness for unrelenting and uninterrupted performance. The metal quality and cost-reducing possibilities obtainable in forgings cannot be duplicated. Recheck every stressed part in your equipment, as well as simple handles and levers, and consult a Forging Engineer about the possibilities for reducing parts' costs at the point of assembly. Only a Forging Engineer can inform you fully regarding the numerous advantages obtainable with forgings.

DROP FORGING ASSOCIATION

A REFERENCE BOOK ON **FORGINGS** FOR ALL USERS OF METAL PARTS

DROP FORGING *Topics* ISSUED 6 TIMES A YEAR

DROP FORGING ASSOCIATION
605 HANNA BUILDING • CLEVELAND 15, OHIO

☐ Booklet on "Metal Quality—How Hot Working Improves Proper of Metals"

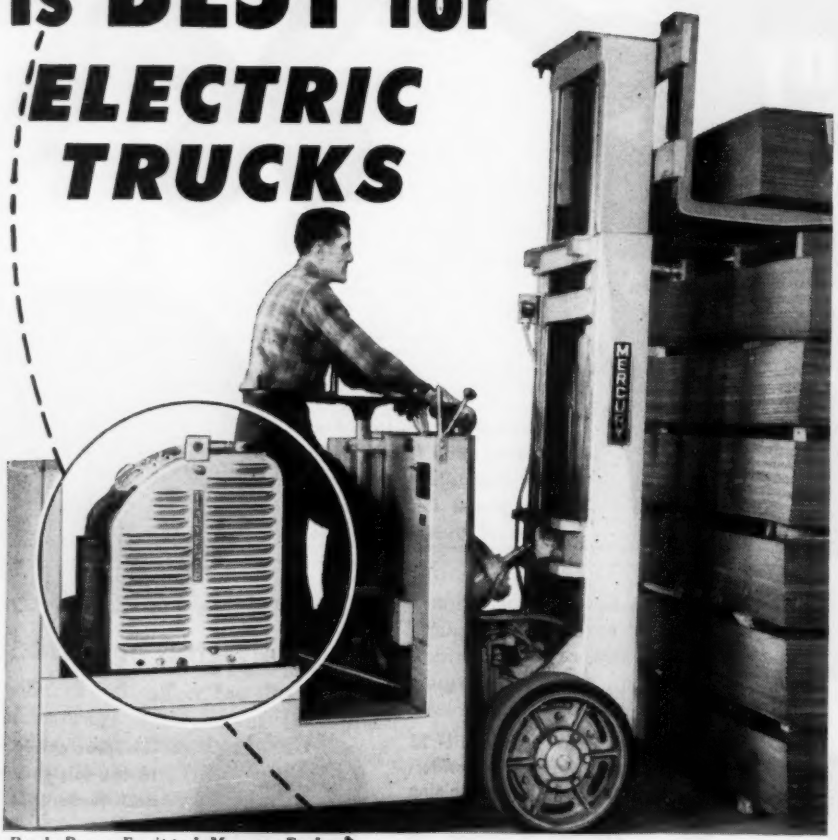
☐ "Drop Forging Topics" which presents numerous end use applicati of forgings.

Name _____ Position _____

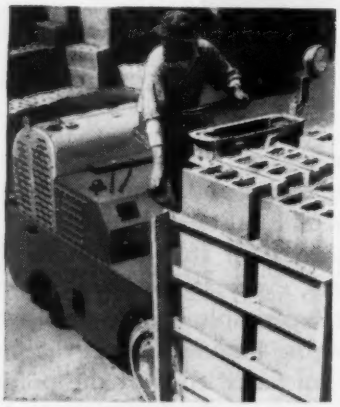
Company _____

Address _____ City _____ State _____

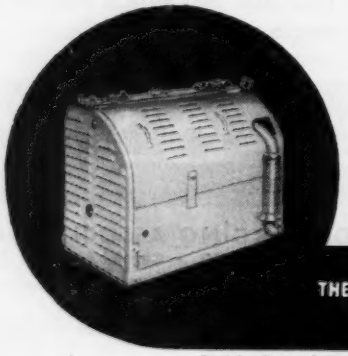
READY-POWER is BEST for ELECTRIC TRUCKS



Ready-Power-Equipped Mercury Fork Truck



Ready-Power-Equipped Clark "Utilitruc"



BEST because Ready-Power delivers "constant-peak" electric power generated right on the chassis by the Ready-Power gas-electric Unit.

BEST because Ready-Power Units are available to fit the specifications of any electric truck manufacturer and can be installed at your request.

BEST because *only* Ready-Power can give you the constant availability of gasoline PLUS the flexibility and low maintenance of electric drive.

THE READY-POWER CO.

3824 Grand River Ave., Detroit 8, Michigan

Quality Control

(*Concluded from Page* 101)

value and perhaps go to a more lenient table. But, if parts are inexpensive, scrapping the whole lot may be cheaper than reinspection and reworking. Clearly, sampling procedures must be tailored to fit the conditions that apply; there is no fixed rule to govern application. Inspection costs and the effects of allowing defects to pass are among the factors that demand consideration in making a decision.

Often it is better to start with 100 per cent inspection of a new part, especially if it is quite different from others on which experience has been accumulated. But once a reasonable amount of sampling experience has been accumulated, application of statistical control methods becomes feasible and often saves much in costs without sacrifice in quality.

Statistical quality control in the aircraft industry is comparatively new but results may be startling if statistical methods are considered and used as new tools. They must supplement and not supersede the knowledge and techniques that have long been a part of successful quality control programs.

Carbon Arc Projection Movie Going Abroad

Optics of motion picture projection, what the carbon arc is and how it operates and why the light source has the brilliancy and color balance ideally suited for motion picture production and projection is explained in the film "Carbon Arc Projection", produced by National Carbon Co. Inc., New York. This motion picture produced in technicolor, has been selected by the Office of International Information, Department of State, for distribution throughout 52 foreign countries and their dependencies.

The Division of International Motion Pictures selects documentary and informational films covering many aspects of American life to be shown to foreign audiences. It is felt by supplying films and other material, industrial America can make a real contribution to the understanding of the United States abroad.

—o—

Standard specifications, chemical practices, standard mill tolerances, packaging, marking and loading methods for carbon steel plates and rolled floor plates are included in Steel Products Manual, section 6, published by American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y. Copies of this revised manual are available from the Institute for 25 cents each.

For consistently fine stainless steels, specify

VANCORAM FERRO CHROMIUM

SELECTED TO RESIST NITRIC ACID on the inside surface and atmospheric conditions on the outside, the stainless steel installation shown in the accompanying photograph has a record of over twenty years of satisfactory service.

This is a highly successful use of just one of the more than forty cast and wrought types of stainless steel available for resistance to chemicals, or sea water, or dyes, or foodstuffs, or numerous other environments for which they have already proven highly advantageous.

Regardless of the type, however, *quality* and *precise analysis* are primary requisites for success. To insure production of consistently fine stainless steels, Vancoram Brand Ferro Chromium is available, made by closely controlled processing methods and from carefully selected raw materials. The low-carbon grades for the manufacture of stainless steel are supplied with a carbon content from 0.06% max. to 2.00% max., all containing from 67% to 72% chromium.

If you have a technical problem involving the making, treatment, fabrication, properties, or performance of stainless steel, our metallurgical engineers will be glad to help you solve it.

VANADIUM CORPORATION OF AMERICA

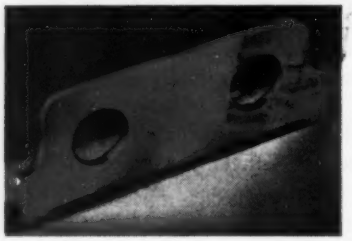
420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF FERRO-ALLOYS

VANCORAM

CHEMICALS AND METALS

SAVE THESE 8 WAYS WITH LAMINUM* SHIMS!



LAMINUM shims are laminated shim brass or steel built into a "solid", unit structure by an exclusive process.

1 Assembly time reduced up to 30%. No precision machining, grinding, filing, miking.

2 All adjustments made at the job by peeling laminations. No standby lathe.

Simply p-e-e-l for your adjustments. No machining, filing or grinding required for accurate factory assembly or service adjustments.

3 No fumbling and counting loose, paper-thin wafers.

4 Less compressible than ordinary one-piece or stacked shims.

5 Cut to your exact specifications. Less than 1% rejects over the years.

The remaining "solid" shim is always uniform in gauge, with a hard surface . . . clean and smooth as glass.

6 Can be fitted with babbitted lugs to prevent oil and pressure loss.

7 No new skill required for use.

8 Your customer recognizes the plus value of less "down time" for maintenance and adjustment.

Send today for chart illustrating 46 money-saving, time-saving applications, detailed specifications, sample of LAMINUM.

PRECISION STAMPINGS in any quantity

Let us quote on your *difficult* stamping jobs. Our experience, tools and presses are geared for *close tolerance* production.

* LAMINUM (Reg. U. S. Pat. Off.) shims are solidly bonded laminations of .002 or .003 inch precision gauge brass or steel with a microscopic layer of metallic binder. Cut to your exact specifications.

LAMINUM TRADE MARK

THE SOLID SHIM THAT peels FOR ADJUSTMENT

LAMINATED SHIM COMPANY, Inc.

3404 Union Street Glenbrook, Conn.

SHIMS SHIM STOCK STAMPINGS AN-COR-LOX NUTS

New Books

Diamond Tool Patents III—Truing of Grinding Wheels, by W. Jacobsohn; 88 pages, 52 illustrations; published by Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd., London.

This publication, the third in a series on diamond tool patents, contains 500 abstracts of British, American and German patents referring to the design, arrangement or use of a particular truing device. Owing to the large number of patents, the compilation is limited to the years 1916 to 1946. The patents are listed and classified in numerical order.

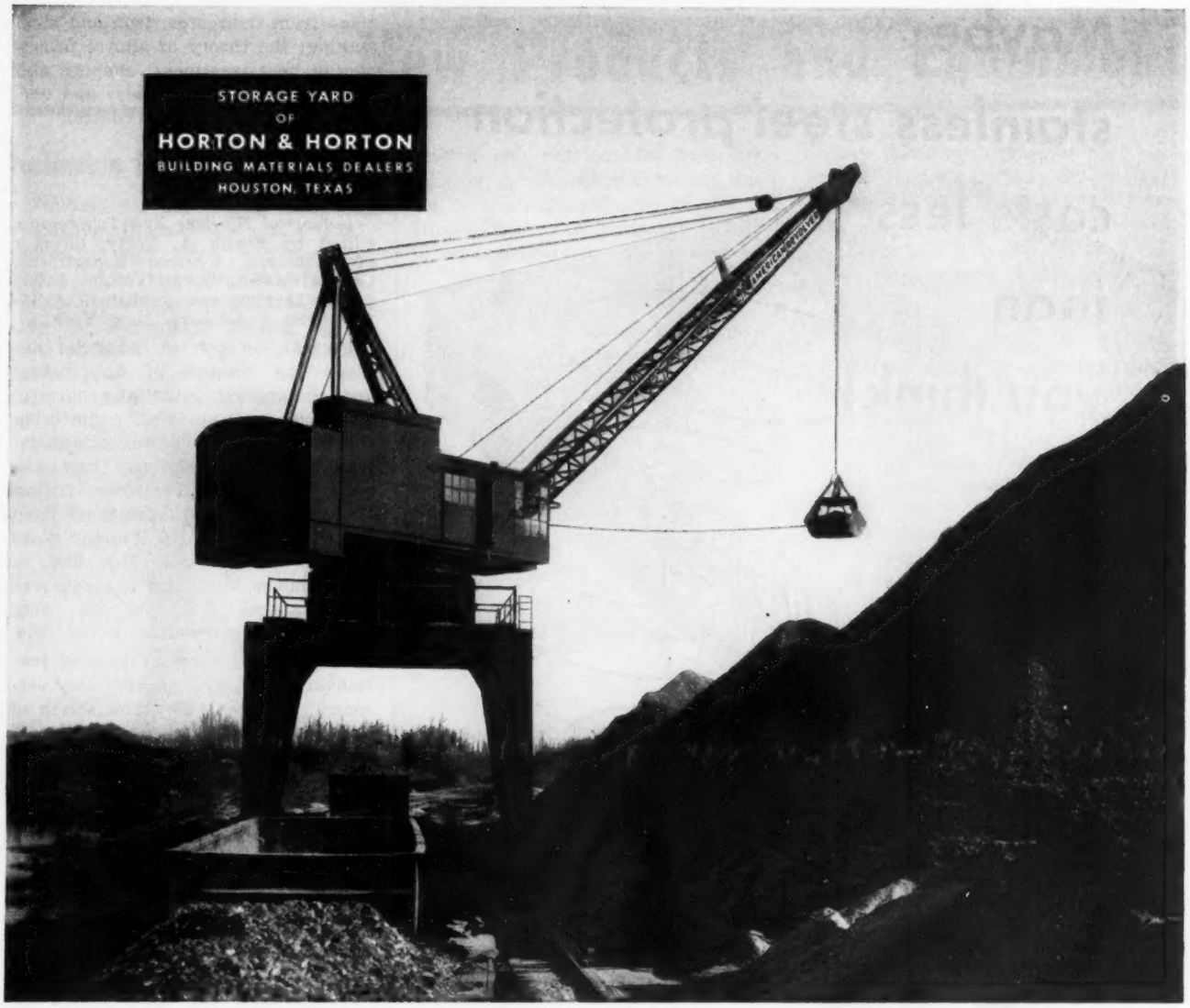
Classification is based on the following characteristics: Type of tool, whether roller or diamond cutting tool; operation, whether hand tool, hand or power operated mechanism; arrangement, portable or permanently fixed; and purpose, straight faces, radius, profile, thread or gear. In many instances only a small part of the specification has been abstracted as often the actual purpose of the specification has no bearing on the truing arrangement.

—o—

Engineering Metals and Their Alloys, by Carl H. Samans, chief, metallurgy section, research laboratory, American Optical Co.; cloth, 913 pages, 6½ x 9½ inches; published by MacMillan Co., New York, for $7.50.

Containing 555 photographs, drawings, graphs and photomicrographs and 56 tables, this book gives a background of metallurgy which should fill the needs of any user of the metallic material. By proper selection of chapter, either production, physical or engineering metallurgy can be adequately covered, regardless of where the emphasis is placed, on the ferrous or upon any of the seven important nonferrous metals. The number and selection of photomicrographs used is extremely complete.

The author states that there is actually very little new in this text and that it does not concern itself with the frontiers of metallurgical science. The treatment largely follows standard procedure except in a few sections where some methods which have been found to be effective in classroom work has been incorporated. Classification of the engineering metals is from an application rather than from an alloy viewpoint. Among the chapter heads are as follows: General characteristics of the metallic engineering materials; the pure metal; production of the metals—magnesium, aluminum, and



Build a coal mine in the sky!

This particular mountain happens not to be coal. It's a monster pile of oyster shell, but it illustrates a principle most frequently applied to coal handling.

All over America, smart industrial managers are using this principle, and AMERICAN REVOLVER CRANES, to build coal mines in the sky. With this towering, gantry mounted crane they can build stockpiles as high as five story buildings. They can empty a whole train of cars without moving a car.

And when it comes to reloading—as the small picture shows—the big clamshell on the AMERICAN REVOLVER can fill a 50-ton "battleship" in a matter of minutes.

We don't know how you can beat this principle, if you're handling big quantities of bulk materials. It enables you to use hundreds of acres of ground space, if you want—and all the air above it. It gives you speed sufficient to load 100 cars or more per day. It gives you the economy of one-man operation . . . for handling *millions* of tons.

The AMERICAN REVOLVER is made in five basic models, with boom radii of 80 to 150 feet, lifting capacities of 55,000 to 150,000 lbs. Power may be steam, electric, gasoline, diesel or diesel-electric. For literature showing applications and mechanical data, mail the coupon below.

American Hoist
and DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: So. Kearny, N. J.
Sales Offices: NEW YORK • CHICAGO • PITTSBURGH

American Hoist 9402
and DERRICK COMPANY
St. Paul 1, Minnesota

● Please send me complete information on the American Revolver Crane for materials handling.

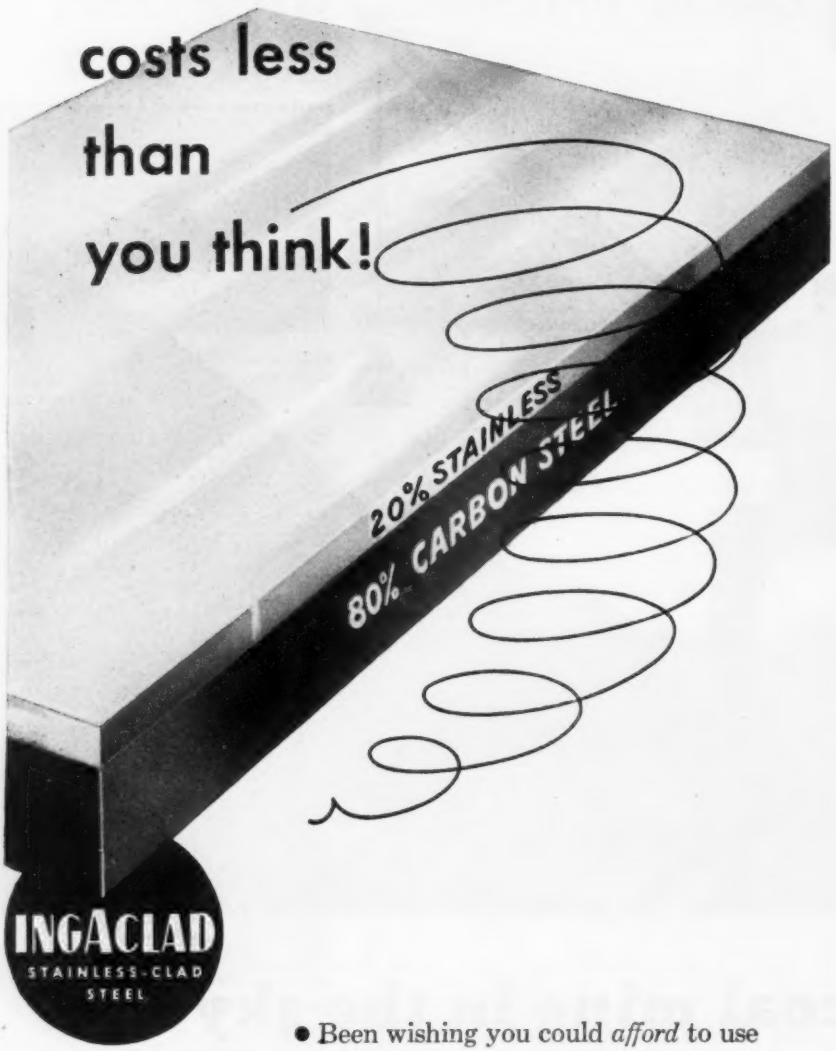
NAME_____

COMPANY_____

ADDRESS_____

19

Maybe *stainless steel protection* costs less than you think!



• Been wishing you could *afford* to use stainless steel in your equipment or products?

Wherever you need stainless protection only on the exposed or contact side, you'll find IngAclad provides 100% contact-side protection against rust, corrosion, abrasion, erosion—yet *costs substantially less* than solid stainless.

And with its permanently bonded 80% backing of carbon steel, IngAclad fabricates easily.

Want to know more? Full details on request—no obligation. INGERSOLL Steel Division, Borg-Warner Corporation, 310 South Michigan Avenue, Chicago 4, Illinois.

ENGINEERING B-W PRODUCTION

zinc—from their ores; iron and steel making; the theory of alloys; principles of heat treatment; shaping and forming metallic materials; and corrosion, its effects and control.

—o—

Industrial Hygiene and Toxicology, edited by Frank A. Patty, director of industrial hygiene department, General Motors Corp.; Volume I, 531 pages, 15 chapters; published by Interscience Publishers, New York.

Present concept of industrial hygiene—the concept of anticipating and recognizing potentially harmful situations and applying engineering control measures before serious injury results—is relatively new, the editor states. As a science, it has been recognized and practiced from the time of the early Romans down through the ages. In this first of two volumes Mr. Patty has authored five chapters, the other ten being authored by authorities in the field.

Some of the subjects covered are: Industrial hygiene survey and personnel; mode of entry and action of toxic materials; environmental factors in fatigue and competence; industrial hygiene records and reports; physiological effects of abnormal atmospheric pressure and radiant energy and radium.

Publishes Nuclear Series

Thirteen volumes of the National Nuclear Energy Series have been declassified and are being edited for publication, according to the U. S. Atomic Energy Commission, Washington, D. C. Expected to run about 60 volumes, the sections and chapters represent about one-third of the 2400 documents so far declassified. The series is being published by McGraw-Hill Book Co. under a contract with Columbia University which represents the AEC and its research contractors.

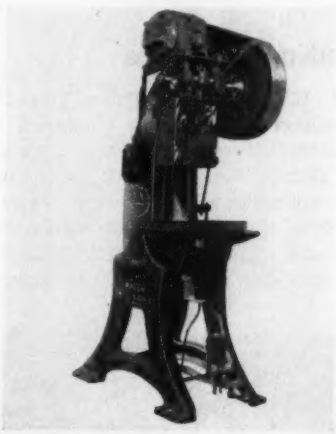
Writes Magnesium Text

"The Story of Magnesium", is the first in a series of Techbooks to be issued by the American Society for Metals, Cleveland. By W. H. Gross of the technical department of Dow Chemical Co., Midland, Mich., the book is written in simple phraseology and is within the education range of the high school students and of workers in industry who do not have professional or technical training. To aid instructors, the charts and illustrations in the book have been made into a film strip which is available at low rental from the publishers.

New Products and Equipment

Inclinable Press

Suitable for die casting trimming operations, the model No. 12X O.B.I. flywheel punch press, introduced by Walsh Press and Die Co., 4709 W. Kinzie St., Chicago 44, Ill., is also suitable for secondary forming operations on sheet metal as well as other punch press operations. The open back inclinable press is offered with



1½ to 4-inch stroke and 9-inch shut height with throat depth of 6-inches. It is adaptable for operations where bulky dies with low tonnage are required.

Incorporated in its design are such features as alloy steel die-forged high tensile strength crankshaft, precision ground and hand-scraped into special hard bronze bearings, high tensile strength press frames. Presses are furnished completely motorized, but can be furnished with a variable speed motor. A two-button safety device with nonrepeat attachment as well as air ejectors can also be furnished.

Check No. 1 on Reply Card for more Details

Electric Furnace

Designed for tool and die work, hardening and drawing and laboratory ash analysis, the No. 11 FM special electric furnace, introduced by K. H. Huppert Co., 6830 Cottage Grove Ave., Chicago 37, Ill., may be used for these and other applications over its entire temperature range from room temperature up to 2000°F. Temperature control is achieved by two Infitrols, stepless input controllers which are mounted on the base of the furnace and a Capacitrol which is mounted beneath the furnace itself.

Furnace has two sets of heating elements, the top and bottom comprising one set and the two sides making up the other element. Each set is controlled by one of the Infitrols, with the temperature governed automatically by the third con-

trol. The floor model furnace is supplied complete with every detail including electric wiring. Inside dimensions are 6 x 8 x 12 inches. Standard operation is preferable on 220 v single-phase current but 110 models are available.

Check No. 2 on Reply Card for more Details

Assembling Press

Daylight is adjustable from 30 to 180 inches in increments of 3 inches on the 25-ton special horizontal assembling press, made by Oilgear Co., 1360 W. Pierce St., Milwaukee 4, Wis. It has an adjustable tail stock capable of resisting full tonnage and is adaptable for assembling a variety of propeller stub shafts in tubes.

Tail stock is moved on hardened and ground ways through a handwheel, pinion and stationary rack. Two 4-inch bore and 6-inch wide split steadyrests with locking levers can be adjusted to any spacing and clamped to the path way. The ram has an auxiliary guide arm and rod. A type DH-2017 2-way variable delivery pump is direct connected to a 15 hp electric motor. Stroke is 17 inches, throat 11¾ inches and pressing speed variable up to 114 inches per minute.

Check No. 3 on Reply Card for more Details

Hand Truck

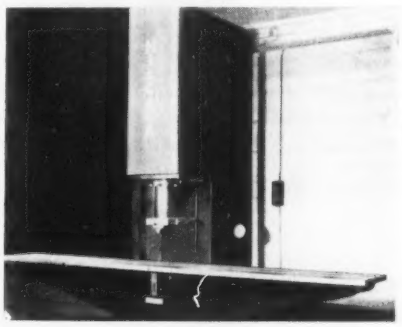
Wheels which revolve on Timken tapered roller bearings that are factory-packed with special waterproof lubricant move the Aerotruker multi-purpose hand truck developed by Aerol Co. Inc., 2820 Ontario St., Burbank, Calif. A cast, single unit frame eliminates constant tightening or replacement of loose members.

An aluminum alloy frame gives the truck light weight as well as making it corrosion resistant and spark proof. Its rubber tires will not separate from the wheel core.

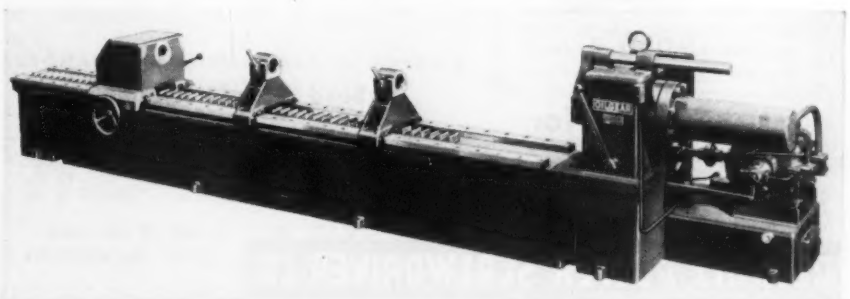
Check No. 4 on Reply Card for more Details

Hydraulic Press

Approach speed, applied pressure of the ram and return speed are governed by the movement of one lever on the new hydraulic metalworking press developed by Niagara Machine & Tool Works, 637 North-



land Ave., Buffalo 11, N. Y. Straightening, forming, broaching, forging and assembling operations may be performed by the press which with the Hydro-Touch control, enables the operator to operate the machine in a smooth fast cycle. Ram approach speed is proportional to initial move-



LADY MACHINE OPERATORS:

MODEL B

YOU don't want to lose the charm and loveliness of your hands through cuts, scratches, dirt, resulting from the out-of-date hand method of driving screws . . . and MANAGEMENT, you don't want to make your plant a first-aid station. Eliminate all this by installing DETROIT POWER SCREWDRIVERS, the modern hopper-fed machines that do the dirty work without the hands coming in contact with the screws.

Manufacturers from coast to coast know how important DETROIT POWER SCREWDRIVERS are where assemblies are fastened with screws . . . what a great saving in time and labor. You, too, should consider them now. There are three models to drive screws from No. 2 to ⅝ at the remarkable speed of one a second. There is a DETROIT POWER SCREWDRIVER to solve your production problem.

Write for Catalog

Send Sample Assembly for Estimate

DETROIT POWER SCREWDRIVER CO.

2811 W. Fort Street
DETROIT 16, MICHIGAN

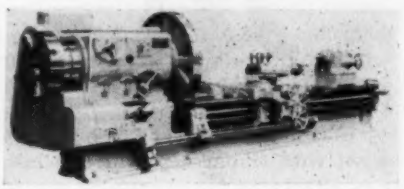
ment of the lever. When the punch first touches the work the pressure exerted is practically nil.

Operator may apply any pressure up to the capacity of the press by moving the lever the desired amount. This feature is of importance in straightening operations because just the right amount of pressure may be applied to remove the distortion. Frame, bed and table are one-piece welded, machined as a single unit. Bed area is 30 x 240 inches. Maximum press capacity is 135 tons which may be exerted at any point in the 33 inches of ram travel.

Check No. 5 on Reply Card for more Details

Combination Lathes

R. K. LeBlond Machine Tool Co., Cincinnati 8, O., has combined its 25-inch/50-inch sliding bed gap and its 27-inch hollow spindle lathe into one machine with a swing capacity of 60½ inches within a 5-foot-wide gap and a spindle hole of 12½ inches. Machine has automatically lubricated



quick change box and a general headstock with heat treated steel gears. Its carriage permits facing full swing of the gap. Hardened and ground steel bed ways are on front and rear on upper bed.

Large bore chucks can be fitted to both ends of the hollow spindle and face plates may be mounted on the flange-type spindle nose. Standard accessories and attachments are available for broadening the productive capacity. Swing over bed and carriage wings is 33½ inches. Distance between centers with base length bed closed and extended is 8 and 13 feet, respectively. There are 12 spindle speeds within the range of 5 to 213 rpm.

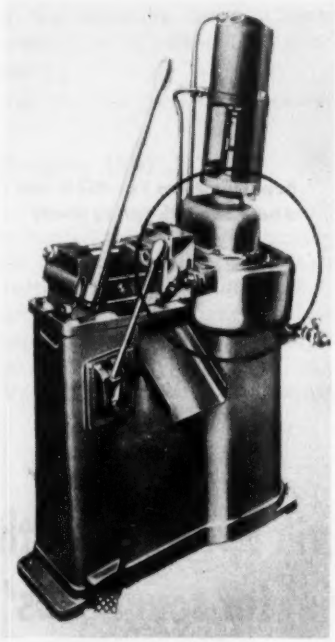
Check No. 6 on Reply Card for more Details

Die Casting Machine

Handling of all standard zinc alloys as well as lead and tin based metals, a modification made on the model M55A/HF high speed die casting machine built by DCMT Sales Corp., 315 Broadway, New York 7, N. Y., was made possible by a new type hydro-action nitra-alloy lined pot which uses hydraulic suction to fill the cylinder. The machine can maintain a production rate of 20,000 shots per

week, producing smooth, clean and relatively flash-free castings and eliminating almost all secondary operations.

Other features of the machine include optional hand and foot controls and a new air system with pilot and

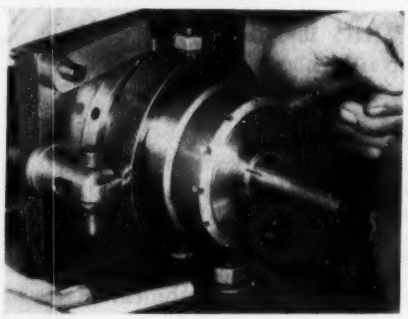


ram valves integral. Machine carriage is undercut for downpulls and ejecting large castings. All metal in the pot may be used before refilling is necessary.

Check No. 7 on Reply Card for more Details

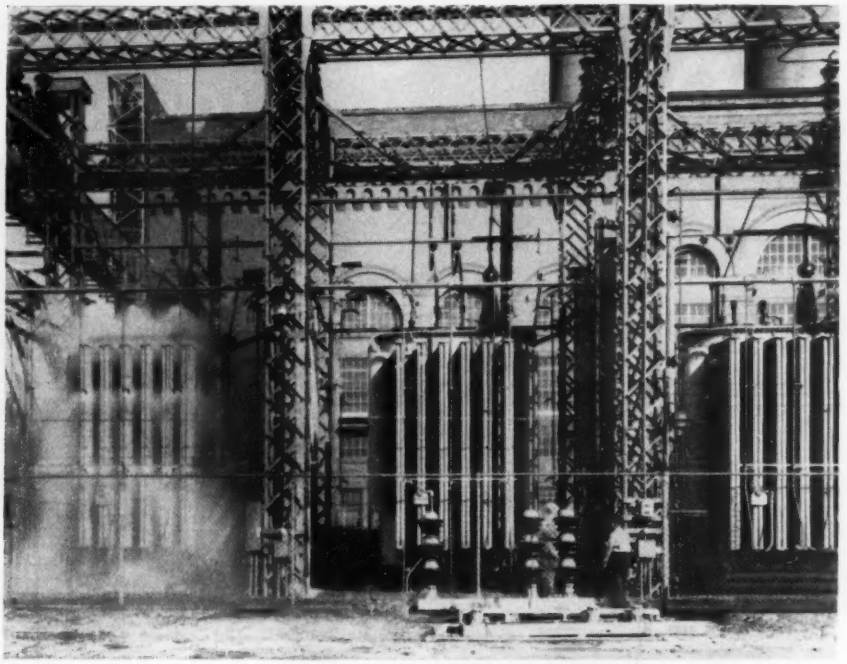
Collet Chuck

A collet chuck which can be mounted on an index plate in a vertical or horizontal position for semiautomatic milling or slotting operations is announced by Goodwin



Mfg. Co., 10 East Broadway, Cuyahoga Falls 20, O. Illustrated chuck is mounted on an angle plate to permit slotting of a ⅜ x 2½-inch pivot pin to a depth of 2⅛-inches. A spring ejector, available as an accessory, can be supplied with the chuck for rapid removal of workpiece.

Fabricated of hardened and ground



Southern utility company's 15,000 KVA transformers under "Automatic" FIRE-FOG blanket of protection

Detect FIRE Fast!
Extinguish FIRE Instantly!

WITH "Automatic" FIRE-FOG

IT'S ELECTRICALLY SAFE AND FIRE SAFE

You don't have to be an economist to recognize the serious financial losses involved in fire incurred power failures in transformers and associated electrical equipment. They're losses that go far beyond the destruction visible to the human eye. Industrial out-of-service time for example, often far exceeds actual property damage, yet seldom is it evidenced in fire reports.... They're unnecessary losses too, for modern "Automatic" FIRE-FOG is now available for the protection of many types of electrical equipment. Detection of fire is automatic... FIRE-FOG operation instantaneous. From strategically located nozzles, a barrage of fine water spray is directed at the heart of the blaze. Flames are beaten down ... the fire area cooled, and seconds later, extinguishment is complete with damage confined only to the point of fire origin. Power service may be readily restored and "Automatic" FIRE-FOG although composed of water, is electrically safe and carries the approval of all leading insurance authorities.

Industry's unremitting demands have past proved the safe, dependable and economical protection provided by "Automatic" FIRE-FOG. What it can do for you can best be told by one of our representatives who will gladly assist in your fire protection planning and furnish surveys and estimates without cost or obligation.

"Automatic" FIRE-FOG
• IT BLANKETS • IT ISOLATES • IT QUENCHES •

... a famous member of the "Automatic" Sprinkler Family ... provides basic fire protection for process equipment and storage in the chemical and petroleum industries. On-the-spot protection for quench tanks, dryers, explosive hazards, conveyor openings, air filters, oil filled electrical equipment and other units vital to production line operations.

"AUTOMATIC" SPRINKLER CORP. OF AMERICA
YOUNGSTOWN 1, OHIO

"Automatic" Sprinkler
FIRST IN FIRE PROTECTION
DEVELOPMENT . ENGINEERING MANUFACTURE . INSTALLATION
OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

Four Questions You Might Ask About Sandvik Spring Steels

What gives Sandvik Spring Steel this "special 'aptitude' for tough jobs"?

"Body" is the main reason why Sandvik spring steels can meet extra tough physical demands.

WHAT IS "BODY"?

"Body" is the inherent quality . . . the "character" of the steel. It cannot be defined merely by analysis or tensile strength figures. It depends upon a uniformity of grain structure which directly effects the physical performance of the metal.

HOW DOES SANDVIK ACHIEVE "BODY"?

Basic purity of raw materials plus specialized methods and close control maintained throughout all processing operations produce the "body" in Sandvik steels. Specifically, Sandvik steels are made from high purity ores, smelted with charcoal, combined with scrap selected from Sandvik's own mills and refined in small furnaces which afford closer control.

HOW ARE SANDVIK SPRING STEELS SUPPLIED?

Sandvik specialty steels are available:

- In straight carbon and alloy grades
- In strip form
- In special analyses for specific applications
- Annealed, unannealed or hardened and tempered
- Precision-rolled in thicknesses from .001"
- With bright finish or polished bright, yellow or blue
- With round edges or square edges
- In a wide range of widths

Phone or write for further information, technical advice or current stock lists.

SOME SANDVIK SPECIALTY STRIP STEELS

Band Saw Steels; Metal Band, Wood Band and Spring Temper · Camera Shutter Steel · Clock and Watch Spring Steels · Compressor Valve Steel · Doctor Blade Steel · Feeler Gauge Steel · Flapper Valve Steel · Knife Steels · Razor Blade Steel · Reed Steel · Shock Absorber Steel · Sinker Steel · Spring Steels · Textile Steels · Trowel Steel Vibrator Reed Steel, etc.

Sandvik Quality Steels

SANDVIK STEEL, INC.

111 EIGHTH AVENUE, NEW YORK 11, N. Y., WAtkins 9-7180
180 N. Michigan Ave., Chicago 1, Ill., FRanklin 2-1745
1736 Columbus Rd., Cleveland 13, O., CHerry 2303
WAREHOUSES: New York and Cleveland

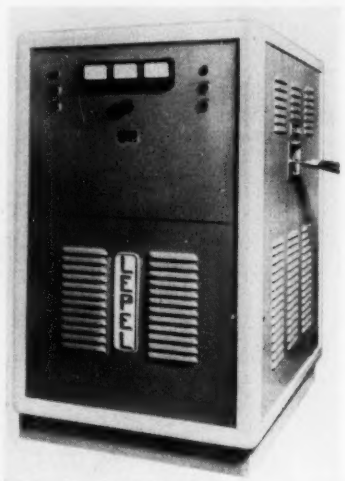
55-42

parts, the quick-acting chuck can be operated by unskilled workers. It utilizes a multiple leverage principle and the cantilever action of hardened steel fingers. The threaded nose cap can be turned to adjust gripping pressure. Pressure setting is locked by a key that engages a spring in the engraved slots on the inner surface of the adjusting collar. Chucks are available with either 1 or 2-inch capacity.

Check No. 8 on Reply Card for more Details

Heating Unit

Ferrous and nonferrous metals may be heated to any desired temperature for hardening, soldering, brazing or melting by the vacuum-tube high-frequency heating unit developed by Lepel High Frequency Laboratories Inc., 39 W. 60th St., New York, N. Y. Housed in an all-steel cabinet, the



unit has heavy duty industrial type vacuum tubes, as well as grounded load coils.

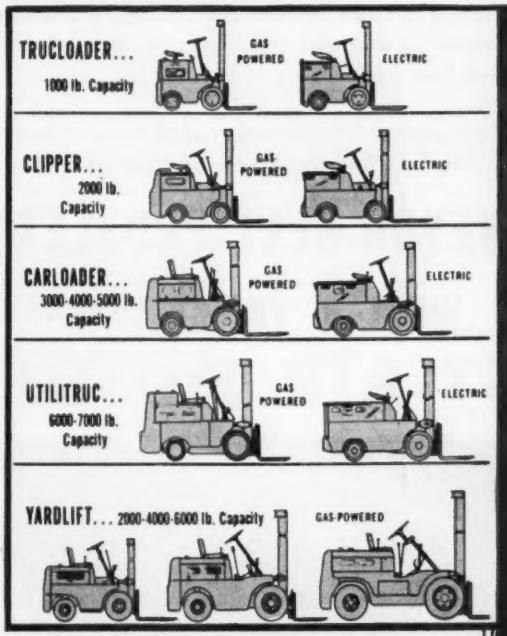
Flexible or rigid leads up to 8 feet in length may be used. The machine consumes 1 gallon of water per minute when idling, and less than 5 gallons at full load. The vacuum-tube unit is easily adjusted to any load and requires no matching transformers or condensers.

Check No. 9 on Reply Card for more Details

Gas Filter

Coke oven gas that accrues as the by-product in the manufacture of coke may be thoroughly cleaned with the new electronic gas filter designed by Trion Inc., 1000 Island Ave., McKees Rocks, Pa. Installation of these units is claimed to save maintenance expense by eliminating clogged burners, jammed valves and regulators. It is designed to filter fuel gases where tar fog, coke dust, fly ash, line dust

MATERIAL HANDLING News®



More than 30 years ago, when Clark undertook to build Materials Handling equipment, it was with a conviction that it could evolve more economical handling methods, and build better machines to implement them. That those high objectives were quickly attained and have been continuously maintained is demonstrated by Clark's leadership in its field. Furthermore, users of Clark machines endorse them enthusiastically for those qualities of fine engineering and workmanship, and rugged dependability which Industry confidently expects from Clark.

Clark builds both gas-powered and electric battery-powered fork-lift trucks, with maximum interchangeability of parts between machines of equal size—a potent factor in production economies which liberally reward Clark users in the form of moderate initial cost, negligible maintenance costs and lower operating cost.

Above all, Clark's unique experience with both power-types permits unbiased analysis of your materials handling needs; and *makes it easy to determine from the facts* which type of machine will serve you most efficiently and economically

It's practical—and exceedingly "good business!"—to enjoy all these basic advantages: simply CONSULT CLARK.

Write for the current issue of "Material Handling News."

GAS and ELECTRIC fork trucks

CLARK BUILDS BOTH

with maximum interchangeability of parts

a complete line ... capacities 1000 to 7000 lbs.

distinguished for LOW COSTS *of* operation *and* maintenance

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

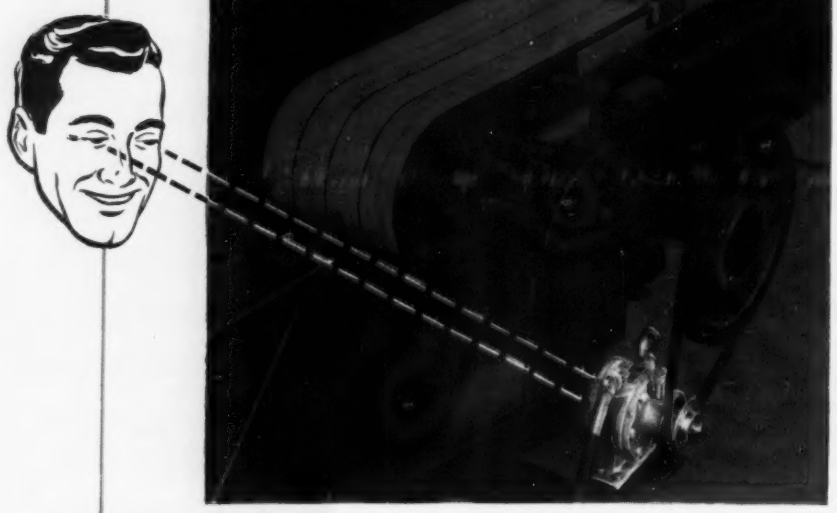
INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 76, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

PROBLEM: To drive a conveyor-belt carrying fragile material and provide automatic belt-speed reduction when drag of load increases.

SOLUTION: A 1 h.p. Gast Air Motor (Model 4AM-FCC-1) connected to plant compressed air line. Maintains constant tension on material in process despite varying load-drag and belt r.p.m.

RESULT: This successful, variable-speed drive reduced material spoilage on this machine—and saved money.

UNUSUAL CONVEYOR-BELT PROBLEM solved with a variable-speed GAST AIR MOTOR



USED FOR MANY APPLICATIONS—From this case history, you can see how Gast Rotary Air Motors solve some unique power problems. As original components on products in *totally different fields*, they offer unmatched advantages. For example:

AIR MOTORS CAN'T BURN OUT—It's possible to stall them but pneumatic motors can't burn out!

CAN'T SPARK EXPLOSIONS—No spark, no danger—Gast Motors are explosion-proof anywhere.

GIVE YOU VARIABLE R.P.M.—From any position, they start and run at 100 to 2,000—some to 6,000 r.p.m.

THEY'RE AMAZINGLY COMPACT—The 1/6 h.p. motor is only 2½" diameter; 1 h.p. is 6-3/8" x 6" high (with foot.)

AND COST IS LOW—Ruggedly built, they offer unique advantages—and cost less! Why not investigate now? We'll gladly cooperate with engineering help.

"AIR MAY BE YOUR ANSWER!"

WRITE TODAY! Request your copy of GAST'S IDEA-CATALOG

GAST ROTARY AIR MOTORS · COMPRESSORS · VACUUM PUMPS
(TO ONE H.P.) (TO 30 LBS.) (TO 28 INCHES)
GAST MANUFACTURING CORP., 133 Hinkley St., Benton Harbor, Mich.

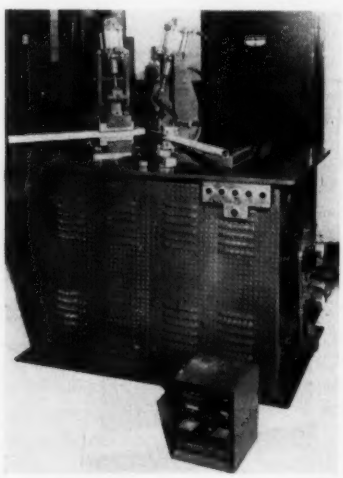
or any combination of dirt causes trouble.

"Packaged" units consist of a steel housing which contains an ionizing-collecting cell, a power pack supply, solvent recirculating system complete with solvent recovery still and all necessary piping and electrical connections. Rated capacity is 60,000 cu ft per hour at a cleaning efficiency of not less than 98 per cent by the discoloration method. Frequency of cleaning the unit, carried on without dismantling, is contingent entirely upon the "dirt loading" of the gas.

Check No. 10 on Reply Card for more Details

Flash Butt Welder

Designed for pipe and tubing the pushbutton flash butt welder, manufactured by Rex Welder & Engineering Co., Kansas City, Mo., has welding heads swivel mounted so that



two pieces can be butt or flash butt welded at an angle. The ends are cut square for both types of welding. Action is entirely automatic and is controlled by microswitches.

One pushbutton does all the work, although for test purposes, the movements can be initiated separately. Each clamping jaw has its own foot valve and air cylinder with pressure regulator. Upset action has its own supply and controls. The transformer has a number of heat tap settings and is fully protected so that upset metal cannot reach it.

Check No. 11 on Reply Card for more Details

Slitting Shear

Mild steel of ⅛-inch thickness and 10 gage in stainless steel may be slit within the capacity of the new portable slitting shear introduced by Beverly Shear Mfg. Co., Chicago, Ill. An adjustable shoe, which provides additional support at the toe of the upper blade holder, gives increased strength and cutting efficiency. A

Runs 'em Up... HAMMERS 'em TIGHT!

HAMMERS 'em LOOSE... Runs 'em OFF!

Powerful
NEW Van Dorn
3/8" Electric
Impact Wrench
$105.00
Speeds Up Running and Removing NUTS, BOLTS, CAP and LAG SCREWS, up to 3/8" thread size!

1. **POWERFUL!** Delivers 2000 blows per minute to hammer fasteners loose or drive them home—*in a few seconds.* (Free running speed: 1600 R.P.M.)

2. **LIGHTWEIGHT!** Weighs only 8¼ lbs.—yet has *driving capacity* of conventional nut runner weighing *almost 30 lbs.!*

3. **EASY TO CONTROL!** Operator can control this perfectly-balanced Wrench by holding it lightly, with one hand! Toggle reversing switch positioned for fast thumb operation.

4. **CUTS OPERATOR FATIGUE!** No jarring, twisting or fighting the Wrench because torque *is not transmitted* to operator.

5. **NO STALLING!** Famous full-powered Van Dorn-built motor *can't* be stalled—even when spindle is stopped dead—no danger of overload or burn-out.

For a real eye-opener in performance, ask your nearby Van Dorn Distributor for a free demonstration of this great, new Electric Impact Wrench. Learn how it can cut your costs, speed up your work, save your workers from excessive, wasteful fatigue! Write for free illustrated catalog to: The Van Dorn Electric Tool Co., 720 Joppa Road, Towson 4, Maryland.

FOR POWER SPECIFY

"Van Dorn"

(DIV. OF BLACK & DECKER MFG. CO.)

PORTABLE ELECTRIC TOOLS

STRUCTURAL STEEL FABRICATION

to meet any specification

for

INDUSTRIAL, OFFICE AND COMMERCIAL BUILDINGS

SCHOOLS

CHURCHES

APARTMENTS

THEATERS

TIPPLES

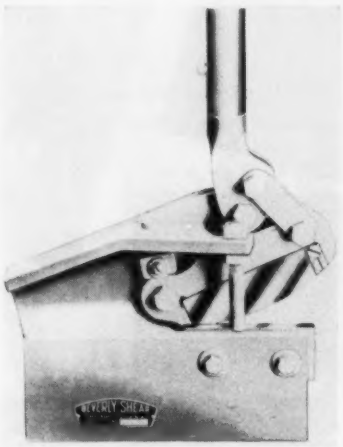
The LEVINSON STEEL COMPANY

32 PRIDE ST. • PITTSBURGH, PA.

LS-3

heavy frame gives rigidity and strength to assure sharp, clean cutting and to prevent any side play or movement of the blades when making cuts.

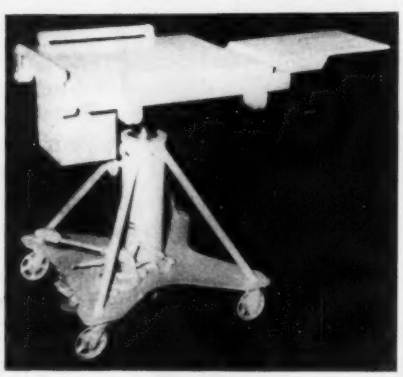
Easy operation is assured by power toggle action of the upper blade holder. Shear blades are interchangeable and adjustable. Shear is furnished with tempered and drawn tool steel blades or high carbon-high chrome blades for working in stainless steel.



Check No. 12 on Reply Card for more Details

Die Transfer Table

Transferring dies from a press having an extended base to a die handling table is possible with the hydraulic elevating table with an overhanging top, counterweighed to provide proper balance when handling dies up to 300 pounds made by Lyon-Raymond Corp., 7418 Madison St., Greene, N. Y. The table illustrated has an overhang 14 inches wide and 24 inches long, this section serving to bridge the gap caused by the press base extension.



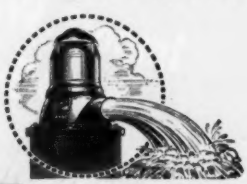
Extension can be removed completely or tilted up to swing 10 degrees back of vertical position when not in use. Table can be hydraulically elevated from 28 inches in lower position to 44 inches in elevated position. The unit has a 30 x 30 inch

SMALL PLANTS are among our best customers

With the largest and most completely equipped organization in the well water developing field, Layne has always provided excellent service for even the smallest plants. In no case have they had to pay a penalty for Layne's world-wide experience and outstanding success. As a matter of fact, Layne Well Water Systems actually cost less when the advantage of unquestionable high quality, proven efficiency and extra long life are considered.

Small plants receive the same professional engineering, skillful workmanship and high quality equipment as is always provided for the largest industries. The only difference is in the size and capacity of the units installed. Several thousand small plants already have their own Layne Well Water Systems. All are highly pleased with their sound investments; the economy of operation cost and the complete dependability of the units at all times.

Small plants of all kinds;--mills, factories, theaters, food processors, packers, railroads, ice plants etc. are invited to make inquiries and to obtain catalogs about Layne's complete service which includes surveys, water strata, explorations, well drilling, pump installations etc. for a complete, thoroughly tested and in operation well water system. No obligation. Address LAYNE & BOWLER, INC., General Offices, Memphis 8, Tenn.



LAYNE WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Wash. ★ Layne-Texas Co., Houston, Texas ★ Layne-Western Co., Kansas City, Mo. ★ Layne-Minnesota Co., Minneapolis, Minn. ★ International Water Corporation, Pittsburgh, Pa. ★ International Water Supply, Ltd., London, Ont., Can. ★ Layne-Hispano Americana, S. A., Mexico, D. F.

main top, single speed foot pump, floor lock type brake, two 5-inch diameter swivel casters and two 5-inch diameter rigid casters.

Check No. 13 on Reply Card for more Details

Tool Balancer

Tools weighing up to 10 pounds may be suspended near the working area for instant use with the new portable tool balancer that is announced by Keller Tool Co., Grand Haven, Mich. Adjustable to all types of tools, it

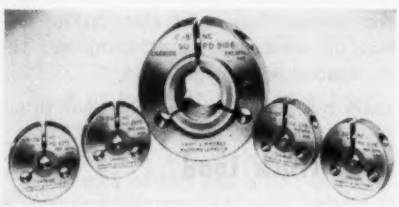
remains vertical under all operating conditions and has a working range of 6 feet.

Little effort is required to bring tools to the job. At completion of the operation, tool is released and returns to a preadjusted position near the work area. Table tension is exactly regulated with nut and lock. Housing of the 5¾ pound balancer is of aluminum, with clock-type suspension spring mounted on oilless bearings.

Check No. 14 on Reply Card for more Details

Thread Ring Gages

Hazard of gage wear on close tolerance work is eliminated by the new go and no go carbide Dualock adjustable thread ring gages announced by Pratt & Whitney Divi-

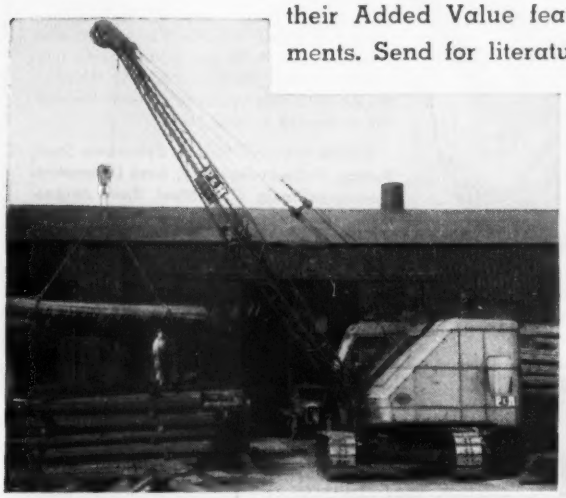


sion, Niles-Bement-Pond Co., West Hartford 1, Conn. The gages may be used as master or reference gages because they have long wearing qualities. They are adjustable because

P&H Crawler Cranes do yard jobs

FASTER, SAFER, AT A SAVING!

Have you the handling efficiency outside your plant that you have inside? P&H Crawler Cranes can give you fast, flexible, versatile yard service with one-man operation — to speed materials handling. P&H Crawler Cranes with their Added Value features are wise investments. Send for literature!



CRAWLER

P&H Crawler Cranes are easy to operate because of P&H's smooth, responsive hydraulic control. You can operate them in close quarters because of P&H's exclusive and simplified method of steering and braking.

MAGNET

Equipped with magnet, the P&H Crawler Crane loads scrap quickly. For those countless lifting jobs in plant yards, you can make no better choice than a P&H. Its construction of rolled alloy steels means extra long, trouble-free service.

CLAMSHELL

Bulk materials are moved speedily and easily with a P&H Crawler clamshell and movement is not restricted to inplace trackage. In addition P&H clear-view, all-weather cabs permit year-round operation.

P&H INDUSTRIAL CRAWLER CRANES
4411 West National Avenue
Milwaukee 14, Wis.
HARNISCHFEGER CORPORATION

There's a P&H Industrial Crawler Crane to Meet Your Requirements. Write Today for Bulletins!

KRANE KAR Loads and Unloads freight cars, trucks, trailers; Stores materials; expedites Plant Maintenance. Often cuts cost of handling loads to 8c a ton.

No Mobile Crane made today can match **KRANE KAR** speed, safety, and economy of operation... picking up, carrying, and placing loads . . . anywhere, in plant or yard . . . uneven terrain, congested areas, low overhead, up and down ramps.

KRANE KAR

MOVES LOADS EASIER - FASTER - SLASHES COST OF MATERIALS HANDLING

KRANE KAR handles loads at Sides as well as at Front.

Gas or Diesel. Pneumatic or solid rubber tires; 9 to 37 ft. booms or adjustable telescopic booms; Electric magnet, clamshell bucket, and other accessories available. Ask for illustrated Bulletin No. 79.

USERS: General Motors, Bethlehem Steel, Boeing, Pullman-Standard, Lima Locomotive, Carnegie-Illinois, U. S. Steel, Basic Magnesium, etc.

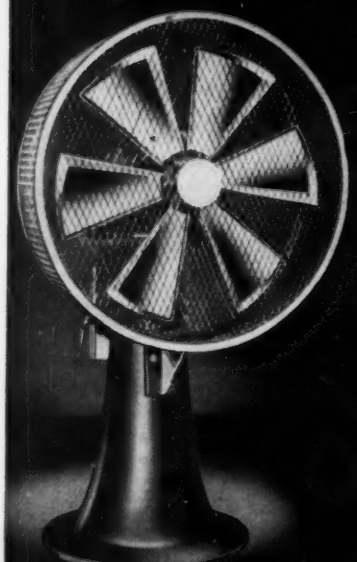
THE ORIGINAL SWING-BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

1¼, 2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE-MARK REGISTERED

SILENT HOIST & CRANE CO., 849 63rd ST., BKLYN 20, N.Y.



• Ruggedly made to withstand severe use .... advanced designing in fan blades .... rigidly mounted and securely locked in place .... well balanced and readily portable by overhead crane or auxiliary truck. Stationary and oscillating types with either pedestal (floor mounting) or bracket (wall mounting).

B. F. Perkins & Son, Inc.

HOLYOKE, MASSACHUSETTS

Manufacturers of Industrial Machinery Since 1873

PERKINS MAN COOLERS

TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

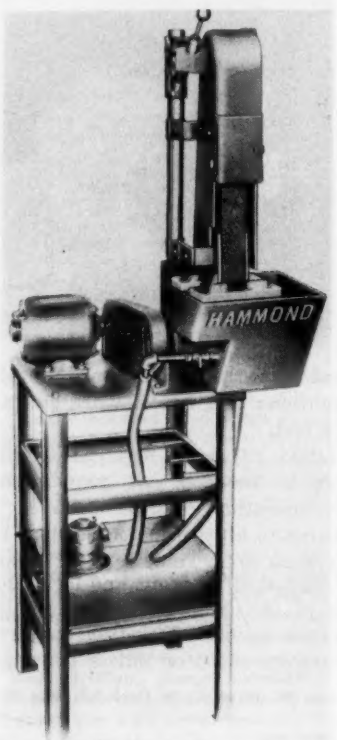
they have the AGD locking mechanism and they are relieved at the major diameter to preclude the possibility of interference.

Both ends are convoluted to remove partial threads up to the start of the full thread. Grinding marks and irregularities on the thread flanks are removed by precision lapping. This lapping corrects variation in thread angle and produces a uniform smooth finish over the entire thread flank.

Check No. 15 on Reply Card for more Details

Belt Grinder

Ferrous and nonferrous metals, plastics and other materials may be wet deburred and finished on the model V-2WP Wet-N-Dri flexible belt grinder, produced by Hammond



Machinery Builders Inc., Kalamazoo 54, Mich. Machine offers advantages of free belt, contour or platen finishing and takes up an abrasive belt up to 2½ inches wide. The model shown has a self-contained tank and pump unit. The same machine is available for connection to water main and can be used dry by shutting off the coolant supply.

Check No. 16 on Reply Card for more Details

Fork Truck Load

Loads may be spotted exactly in tight quarters without maneuvering the truck back and forth to an exact position with the shifting attachment for the carriage of any power fork truck made by Lewis-Shepard

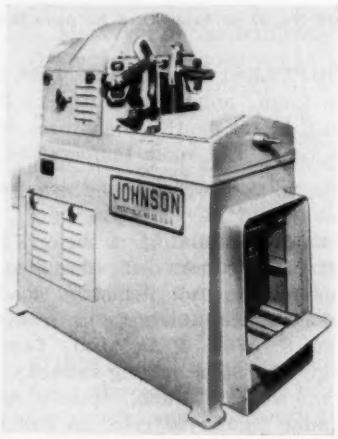
Products Co. Inc., 281 Walnut St., Watertown 72, Mass. Shifting of forks is controlled by a hydraulically operated "deadman" type lever, located on the operator's cab. The forks can be shifted and held by as much as 4 inches to the right or left of center position. Total travel is 8 inches.

Movable portion of the carriage is mounted on 12 hardened alloy steel roller bearings to take horizontal and vertical thrusts, thus reducing friction and permitting a more compact design. Adjustable flow valves control the speed of the side shifting. The necessary hydraulic lines are mounted with double take-up sheaves, which reduce possible complications by insuring proper tension of the lines at all points within the full lifting range of the carriage.

Check No. 17 on Reply Card for more Details

Screw Machine

Production may be increased by means of the rapid changeover feature of the automatic screw machine made by Johnson Automatic Machine Co., Westfield, Mass., on which one



set of cams answers for all jobs. Travel of the forming arm, cut off arm and torque of drill spindle are regulated by segment adjustment. Position of studs in segments or cross slides and drill arm determines the throw, movement or length of travel of tools. Cycle of operation varies from 1.5 to 60 seconds, changed by substitution of cycle gears. Spindle speed is varied by raising or lowering the motor base.

Chips and finished products automatically fall into tote pan located in the base of the machine. An electric fractional horsepower ratio motor, mounted in the machine base, drives the friction feed mechanism so that when the collet opens, the stock feed reel turns, widening in the rope or cable attached to the stock feed push rod. Maximum stock size to feed through spindle is 1 3/16-inch round, 1 1/16-inch hexagon and 1⅛-inch octagon.

Check No. 18 on Reply Card for more Details

Monorail System

Flexible suspension of the track or runway beams from the building structure is a feature of the Trambeam crane and monorail system announced by Whiting Corp., Harvey, Ill. Suspension is through a design of ball-and-socket connection at each end of the beam, the advantage being that there is no distortion on the supporting rods and the load is evenly distributed. Travel on both straight track and around curves is easier and smoother and the building is protected against torsional strains in the supporting members.

Trambeam systems are built in capacity ranging from 500 to 20,000 pounds arranged either for hand or motor operation. They are engineered to fit the handling problem and may range from a single piece of straight monorail to an extensive

DE-STA-CO *Versatility* WORKS FOR YOU!

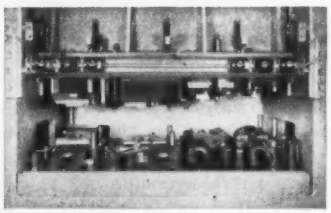
The three parts illustrated are typical of the versatile performance we get from just *one* of our presses. By taking every advantage of modern, high-production equipment, large bed area, progressive tooling and every mechanical aid, we save for you—our customer. That's why buyers across the nation say: "For medium-large jobs and smaller, Detroit Stamping's our Number One source."

Analyze *your* component stampings. Probably there are several that could be handled better the De-Sta-Co way. You'll find it profitable and pleasant to join our distinguished clientele, customers who have helped us build a reputation for

- **Reliability, resulting from 35 years of well-kept promises**
- **Helpful experience and tool-engineering "know-how"**
- **Broad production scope from first-class equipment**
- **Devotion to service and quality**

Our new booklet, "Stampings", describes our plant, over 75 presses—also other equipment, and the range of our production. Please write for your copy and the name of our Stampings Sales Representative in your area.

Automatic Transmission Oil Pan. Formerly tied up two presses; now confined in one press with two dies, cutoff and draw and redraw. Result . . . saving on press labor, saving on handling.



Washing Machine Water Intake Manifold. Originally used four presses. By use of four individual dies in one large press, savings of 25% on press labor, 30% on handling were obtained.

Roof Rail for Semi-Trailer. Stock sheared to 56" length beforehand. Blank is formed and bent in one stroke. This operation utilizes the large bed area (48" x 72") and long stroke (10").

DETROIT STAMPING COMPANY
359 Midland Avenue Detroit 3, Michigan

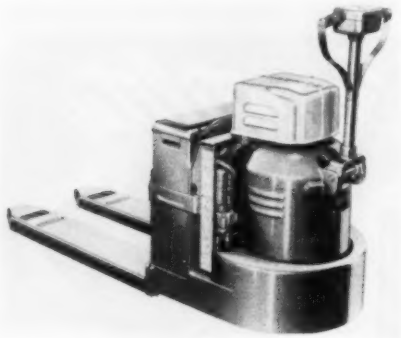
Manufacturers of famous De-Sta-Co Toggle Clamps, Arbor Spacers, Shims, Shim Stock, Blower Housings, Refrigerator Compressor Valves.

combination of monorail and cranes. Through the use of cranes, interlocked with monorail, a system can be arranged to cover practically every inch of working area.

Check No. 19 on Reply Card for more Details

Hand Pallet Truck

Easily maneuvered in close quarters, the battery powered hand pallet truck announced by Towmotor Corp., Cleveland 10, O., has a high safety factor even under maximum loads. Major features include rapid



lifting of loads, high traction, maximum power, safety handle with control buttons for either right or left hand operation and 3-point suspension for smooth travel over uneven surfaces. Differential-action trailer wheels eliminate wheel scuffing and insure easy turning.

Truck has an automatic power cut-off which, upon release of the control handle, instantly cuts off the power supply to the motor and applies a quick-acting brake to the drive shaft, immediately stopping the truck.

Check No. 20 on Reply Card for more Details

• • •

ELECTRODE: Monend 806 electrode produces x-ray quality welds on Monel, Monel clad and steel. Made by Arcos Corp., Philadelphia 43, Pa., it eliminates the necessity of depositing a buffer layer of nickel.

Check No. 21 on Reply Card for more Details

BRUSH HOLDERS: Newly developed special radial brush holders are now being furnished as standard parts on most large direct current motors for reversing operations offered by Allis-Chalmers, Milwaukee, Wis. Holders eliminate brush double-seating and chatter.

Check No. 22 on Reply Card for more Details

WELDING RODS: Eutectic Welding Alloys Corp., New York 13, N. Y., offers EutecTrode 24/49 which has been specially developed to produce strong bonds and high tensile welds that are thoroughly machinable through the weld and weld zone on both gray and alloy cast iron, without preheating. It is available in 3/32, 1/8 and 5/32-inch diameters.

Check No. 23 on Reply Card for more Details

HARD SURFACING POWDER: An improved hard surfacing powder, called Surfaceweld A, is available from Lincoln Electric Co., Cleveland, O. The powder, to be applied with a carbon electrode, is used for depositing a thin chromium carbide type of hard surface that is resistant to abrasive wear and corrosion.

Check No. 24 on Reply Card for more Details

SURFACE PLATE: A new ceramic surface plate, designed for use in toolrooms and inspection departments where precision setups and checking measurements require a high degree of accuracy, is announced by Norton Co., Worcester, Mass. Three advantages afforded by this plate are: Extreme wear resistance, a precisely flat surface guaranteed to be within 0.0001-inch and a continuously smooth surface finish.

Check No. 25 on Reply Card for more Details

FUEL OIL TREATMENT: For more effective atomization and greater Btu release of any grade of fuel oil, Dacarol A has been developed by Dacar Chemical Products Co., Pittsburgh, Pa. It is an activated fuel oil treatment that readily attacks both oil sludges and water condensation.

Check No. 26 on Reply Card for more Details

PALLET RACKS: A new type portable rack for stacking palletized materials is offered in standard and heavy duty models by Equipment Mfg. Co. Inc., Detroit 5, Mich. They can be installed by spotting them in place with fork trucks; no welding or cutting is necessary.

Check No. 27 on Reply Card for more Details

WASH-RINSE TANK: A 16 gage hot-dipped galvanized steel tank for general washing, rinsing and dipping operations is offered by Rite-Way Products Co., Chicago 13, Ill.

Check No. 28 on Reply Card for more Details

RECESSING TOOLS: Maxwell Co., Bedford, O., announced two new small size series R recessing tools. Models No. 1 and No. 2 tools have overall length of 2 13/16 and 4 inches and are available for cutting recesses from 3/8 to 1 inch and from 1 to 2 inches.

Check No. 29 on Reply Card for more Details

BLACK PAINT: Chem-Rem, a new acid and alkali resisting black paint for use on metal, masonry or wood, is announced by Speco Inc., Cleveland, O. It can be applied by brush, spray or dip method.

Check No. 30 on Reply Card for more Details

MOTOR: A new line of 4-pole shaded pole single bearing motors in models up to 9 watts output is offered by Redmond Co. Inc., Owosso, Mich. Designated as type AM, these Mono-Motors were developed for refrigerator, air conditioning, heating, ventilating and similar motor applications.

Check No. 31 on Reply Card for more Details

PORTABLE PUMP: Eco Engineering Co., Newark 1, N. J., offers gearless pump PP-2, powered by 1½-hp single cylinder, four cycle air-cooled gasoline engine. It can be used for pumping from cisterns, pumping out cesspools and for sump cleaning.

Check No. 32 on Reply Card for more Details

PROTECTIVE COATING: To eliminate the necessity of having to remove all rust or to have surface perfectly dry before painting, Wilbur & Williams Co., Boston 15, Mass., offers Rust-O-Primer, a combination chemical pretreatment and primer.

Check No. 33 on Reply Card for more Details

STRIPPERS: Enthone Inc., New Haven, Conn., announces strippers S-17 and S-19 for synthetic enamels. Both can be used at room temperature.

Check No. 34 on Reply Card for more Details

ELECTRIC DRILL: A heavy duty portable electric drill, designed to stand up to full industrial loading and toughest metals, is available from S. Wolf & Co. Ltd., London, England. Steel drilling capacity, 3/8-inch; wood, 5/8-inch; spindle speed running light, 750 rpm; on full load 450 rpm.

Check No. 35 on Reply Card for more Details

CHIPPING TOOL: Atlas Welding Accessories Co., Detroit 20, Mich., announces Re-Bit, a weld chipping hammer that makes replacement of worn bits practical. It is offered in 12 and 16 ounce weights with a choice of Flex-o-steel or wood handle.

Check No. 36 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

SECOND quarter is getting under way with the steel markets displaying increasing signs of retreat from postwar peaks in demand and prices. Producers entered the period with tonnage arrearages in all major products, but they are far less behind on current commitments than they were three months ago, and all the signs now point to attainment of supply-demand balance much sooner than generally had been anticipated. New demand is sagging. Consumer pressure on prices is mounting, stimulated by reductions in premium quotations, sharp declines in gray market and imported steel prices, the latter in some cases below domestic mill levels, and by continuing sharp reductions in scrap and accompanying softening in the pig iron market.

DEMAND—New buying is noticeably off with consumers highly inventory conscious. Manufacturing operations continue to slacken and buyers are ordering only for definite needs. With signs multiplying of approaching supply-demand balance in the standard market in most products the mills are soliciting business more actively than at anytime since before the war.

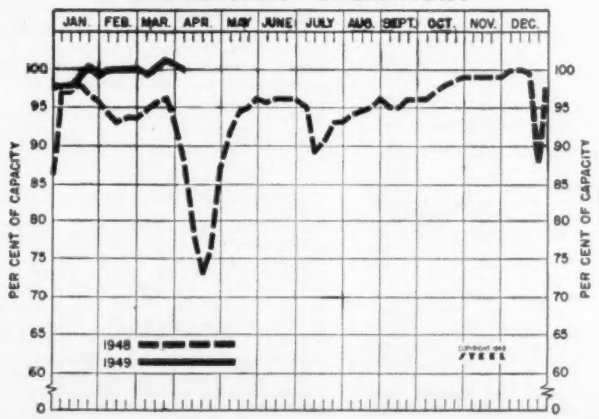
Reversal of the tendency of steel mills to withdraw from remote areas is indicated by offerings of steel tonnages to a number of customers within the past 10 days. A platemaker in the East is reported offering sizable tonnages for sale in the Chicago area, a Pittsburgh sheet producer is soliciting business in western Michigan, an eastern shapemaker is offering structurals in Midwest districts from which it withdrew some months ago, while Ohio and Pittsburgh mills are making substantial offerings of ex-quota tonnages in the Chicago district.

SUPPLY—With the withdrawal of buyers from the market more tonnage is being offered for much earlier delivery than was the case only a few weeks ago. Structural shape supply is easing and imported shapes in American warehouses are reported available at substantial price sacrifices, in certain cases below domestic mill levels. It is estimated more than 90,000 tons of imported shapes, largely from Belgium, are in storage along the eastern seaboard.

PRICES—Consumer pressure for price reductions is rising in step with slackening demand. Up to the present, standard mill prices have held firm. Sharp downward adjustments have been made in premium quotations, however. At the same time imported steel is being offered below domestic mill prices. Scrap is taking a beating with the mills and foundries holding out of the market except for small purchases. Prices are down sharply from a week ago. Views are mixed with respect to the immediate trend of steel prices. Some authorities anticipate no early change, at least nothing of a sweeping character. They point out scrap is the only soft spot insofar as production costs are concerned. Some trade authorities are certain lower prices are on the way but think it unlikely downward adjustments, except for minor changes, will be made before third quarter.

COMPOSITES—Reflecting the sharp drop in scrap, STEEL's price composite on steelmaking scrap last week dropped $3.33 to $30.33, lowest since the first week in June, 1947, when it was $30.08. A year ago the scrap composite stood at $40.25. Further decline is anticipated with the mills continuing to hold out of the market and tonnage piling up in dealers' yards. The composite for finished steel also eased last week, slipping to $96.68 from $97.23 the preceding week, and comparing with $81.14 in the like week a year ago. The pig iron composite has held at $46.22 since the end of January and compares with $39.31 at this time a year ago. Semifinished steel composite also held unchanged last week at $70.14, comparing with $68.72 a year ago.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended April 2	Change	Same Week 1948	Same Week 1947
Pittsburgh	97.5	— 2.5*	92	99.5
Chicago	99.5	— 1.5	94	95
Eastern Pa.	94.5	— 1	76	90.5
Youngstown	101	None	83	91
Wheeling	96.5	None	93.5	93.5
Cleveland	103	— 3	91.5	96
Buffalo	104	None	70	88.5
Birmingham	100	None	74	99
New England	88	— 1	77	94
Cincinnati	103	None	96	92
St. Louis	82.5	None	82.5	75
Detroit	104	— 7	104	90
Western	99.5	+ 2.5	..	..
Estimated national rate	100	— 1	88	97

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. * Revised.

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Apr. 2	Mar. 26	Month Ago Mar. 1949	Year Ago Apr. 1948	5 Years Ago Apr. 1944
Finished Steel	$96.68	$97.23	$97.17	$81.14	$56.73
Semifinished Steel	70.14	70.14	73.51	68.72	36.00
Steelmaking Pig Iron	46.22	46.22	46.22	39.21	23.00
Steelmaking Scrap	30.33	33.66	34.60	40.41	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Feb. 1949	4.20580c
Jan. 1949	4.20580c
Dec. 1948	4.20208c
Feb. 1948	3.54374c
Feb. 1944	2.38787c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods, on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. January and February, 1949, figures are preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Apr. 2, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Steel bars, Pittsburgh mills	3.35c	3.43c	3.45c	2.90c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8094	3.356
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.25	3.27	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.4918	3.4918	3.4888	2.968
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.7256	3.7256	3.7217	3.19
Sheets, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.95
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.95
Strip, hot-rolled, Pittsburgh mills	3.275	3.275	3.275	3.05
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.80
Bright basic, wire, Pittsburgh	4.15	4.255	4.325	3.775
Wire nails, Pittsburgh mills	5.20	5.545	5.775	5.20
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$60.00
Slabs, Chicago	52.00	52.00	52.00	45.00
Rerolling billets, Pittsburgh	52.00	56.20	59.00	45.00
Wire rod 5/16 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.175c

* Nominal. † 1.50 lb coating.

Pig Iron

	Apr. 2, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$40.996
Basic, Valley	46.00	46.00	46.00	39.00
Basic, eastern, del. Philadelphia	50.3002	50.3002	50.2676	42.004
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	40.496
No. 2 fdry., del. Philadelphia	50.8002	50.8002	50.7676	42.504
No. 2 foundry, Chicago	46.25	46.25	46.25	39.00
No. 2 foundry, Valley	46.50	46.50	46.50	39.50
Southern No. 2 Birmingham	43.38	43.38	43.38	37.88
Southern No. 2 del. Cincinnati	49.43	49.43	49.09	41.857
Malleable, Valley	46.50	46.50	46.50	39.50
Malleable, Chicago	46.50	46.50	46.50	39.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	55.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	170.20	163.00	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$32.50	$37.00	$41.90	$40.25
Heavy melt. steel, No. 2, E. Pa.	23.50	30.70	40.00	39.00
Heavy melt. steel, No. 1, Chicago	31.00	33.30	40.00	39.00
Heavy melt. steel, No. 1, Valley	29.25	35.85	39.75	40.25
Heavy melt. steel, No. 1, Cleveland	28.25	34.10	45.88	39.75
Heavy melt. steel, No. 1, Buffalo	30.50	35.95	45.88	43.00
Rails for rerolling, Chicago	39.50	43.85	59.38	49.50
No. 1 cast, Chicago	34.50	39.20	58.38	68.40

Coke

Connellsville, beehive furnace	$14.50	$14.50	$14.50	$12.55
Connellsville, beehive foundry	17.00	17.00	17.00	14.875
Chicago, oven foundry, ovens	20.40	20.40	20.40	19.25

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $90-$95 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $62, Conshohocken, Pa.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $70, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $90 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & 5/16-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Portsmouth, O., Los Angeles; 4.15c Monessen, Pa. Basic open-hearth and bessemer, not resulphurized, 7/32 to 47/64-inch, inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.55c, Ecorse, Mich.; 4.00c Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 4.40c, Atlanta.

Rail Steel Bars: (Base 10 tons): 3.35c, Moline, Ill.; 4.75c, Williamsport, Pa.; 3.55c, Huntington, W. Va.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.50c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Struthers, O.; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; another interest quotes 5.35c, mill.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.25-3.30c, Cleveland; 3.30c, Pittsburgh; 3.45c, Ecorse, Mich.; 3.95c, Pittsburgh, Torrance, Calif.; 4.15c, Fontana, Calif.; 5.00c, Conshohocken, Pa.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 4.65c, Niles, O.; 5.05c, Torrance, Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.00c, Niles, O.; 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.55c, Niles, O.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.; 6.00c, Niles, O.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren, O.; 6.05c, Niles, O.
Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.; 6.55c, Niles, O.
Motor: 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O.
Dynamo: 7.50c, mill, except: 7.70c, Granite City, Ill.
Transformer 72, 8.05c, mill, except: 9.15c, Follansbee, W. Va., Toronto, O.; 10.05c, Brackenridge, Pa.; 65, 8.60c, mill, except: 9.85c, Follansbee, W. Va., Toronto, O.; 10.60c, Brackenridge, Pa.; 58, 9.30c, mill, except: 10.55c, Follansbee, W. Va., Toronto, O.; 11.30c, Brackenridge, Pa.; 52, 10.10c, mill, except: 11.35c, Follansbee, W. Va., Toronto, O.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Youngstown; 5.25c, Ecorse, Mich., and Conshohocken, Pa., mills. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh, Riverdale, Ill.; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Atlanta; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, S. San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 4.65c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less); 4.00c, mill, except 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.20c, Ecorse, Mich.; 4.25c, Riverdale, Ill.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.80-5.05c, Wallingford, Conn.; 5.75c, Los Angeles; 5.55c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Struthers, O.; 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich., mill.

Tin, Terne Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Hollowware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point. Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.60c, Pittsburgh; 3.65c, Ecorse, Mich.; 3.75c, Coatesville, Pa.; 3.95c, Claymont, Del., Conshohocken, Pa.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston, Tex.; 5.30c, Fontana, Calif.; 4.95c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 5.10c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.10c, Coatesville, Pa.; 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.40c, Youngstown; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.75c, Phoenixville, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 3.80c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 5.15c, Struthers, O.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo., Atlanta, Buffalo; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa., Portsmouth, O.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.40c, Aliquippa; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 109, Worcester, Mass.; 110, Minnequa, Colo., Atlanta; 123, Pittsburg, Calif.; 124, Cleveland. One producer quotes column 103, Chicago and Pittsburgh base; another, column 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Portsmouth, O., Kokomo, Ind.; 116, Minnequa, Colo.; 121, Atlanta; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 126 Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 110, Atlanta; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50-28.75	30.50-32.00	37.50-40.75
302	28.50-28.75	33.00-33.75	37.50-40.75
303	31.00-31.50	36.50-39.75	39.50-43.00
304	30.00-31.25	35.00-35.75	39.50-43.00
316	46.00-48.00	55.00-57.25	53.00-57.25
321	34.00-34.75	44.50-45.75	45.50-49.00
347	38.50-39.75	48.50-50.25	50.00-54.00

STRAIGHT CHROMIUM STEELS

410	22.75-23.00	26.50-27.00	32.00-33.00
416	23.25-23.50	28.25-33.50	32.50-33.50
430	23.25-23.50	27.00-27.50	34.75-35.50
446	32.50-33.00	60.00-62.25	46.50-50.00

STAINLESS-CLAD STEELS

	Plates —Cladding— 10%	Plates —Cladding— 20%	Sheets —Cladding— 10%	Sheets —Cladding— 20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants; reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton. Discounts from base follow:

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Blk.	Gal.
⅛	39½	10	1	46	26½
	41½	14		48½	29
¼	37½	11	1¼	46½	27
	39½	15½		49	29½
⅜	34	6	1½	47	27½
	36	10½		49½	30
½	40½	19½	2	47½	28
	43	23		50	30½
¾	43½	23½	2½, 3	48	28½
	46	26		50½	31
			3½ & 4	44½	24

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	39½	19	38½	16½	27	6½
					38½	18½
2½	42½	22	41½	19½	32½	12
	43½	23			41½	21½
3	42½	22	41½	19½	35	14½
	43½	23			41½	21½
3½&4	42½	22	43½	21½	38½	18
	46½	26			43½	23½
5 & 6	42½	22	43½	21½	38½	18
	44½	24			43½	23½
7	....	....	....	....	43½	22

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Butt Weld Blk.	Butt Weld Gal.
⅛	40½	....	1¼	46	27½
¼	38½	....		48	28½
⅜	35	....	1½	46½	28
½	40	20		48½	29
	42	21	2	47	28
¾	43	24		49	29½
	45	25	2½ & 3	47½	28½
1	45½	27		49½	30
	47½	28	3½ & 4	43½	....

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	38½	18	37½	15½	26	5½
					37½	18
2½	42½	22	40½	19½	31½	11
					40½	20½
3	42½	22	40½	19½	34	13½
					40½	20½
3½-4	41½	21½	42½	20½	37½	17
	45½	25			42½	22½
5 & 6	41½	21½	42½	20½	37½	17
	43½				42½	22½
8	45½	....	44½	21½	40½	19
				22	44½	23½
10	45	....	44	21	41½	20
				21½	44	23
12	44	....	43	20	40½	19
					43	22

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

In.	Butt Weld Blk.	Butt Weld Gal.	In.	Lap Weld Blk.	Lap Weld Gal.
⅜	+59½	+95½	1¼	+22	+53
½	+20½	+52½	1½	+15½	+45½
¾	+10½	+41½	2	+ 7½	+36½
1 and 1¼	+ 4½	+32½	2½-3½	+ 5	+32
1½	— 1½	+29	4	List	+26
2	— 2	+28½	4½-8	+ 2	+27½
			9-12	+12	+37

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24", inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	.....	13.39-14.64	13.00	13.00
1¼	13	.....	15.87-17.34	13.21	15.39
1½	13	16.45	17.71-19.35	14.60	17.18
1¾	13	18.71	20.16-22.02	16.60	19.54
2	13	20.96	22.56-24.66	18.60	21.89
2¼	13	23.36	25.16-27.50	20.73	24.40
2¼	12	23.54-25.73	27.70-30.28	22.83	26.88
2½	12	25.79-28.19	30.33-33.15	25.02	29.41
2¾	12	27.33-29.87	32.14-35.13	26.51	31.18
3	12	28.68-31.35	33.76-36.90	27.82	32.74
3¼	11	33.39-36.50	39.29-42.95	32.39	38.11
3½	11	35.85-39.19	42.20-46.13	34.78	40.94
4	10	44.51-48.65	52.35-57.22	43.17	50.78
4½	9	58.99-64.47	69.42-75.88	....	....
5	9	68.28-74.64	80.35-87.82	....	....
6	7	104.82-114.57	123.33-134.81	....	....

Pipe Cast Iron: Class B, 6-in. and over, $98.50 per net ton, Birmingham; $106.70, del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill, except: $3.50, Indiana Harbor, Ind., and Minnequa, Colo.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $4.50 per 100 lb, Williamsport, Pa.; 3.55c, Huntington, W. Va.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes, 5.35c, mill.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Philadelphia, del.	50.3002	50.8002	51.3002	51.8002
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.43	....	....
Buffalo, furnace	47.00	47.00	47.50	48.00
Boston, del.	56.20	56.20	56.70	....
Rochester, del.	49.35	49.35	49.85	50.35
Syracuse, del.	50.2065	50.2065	50.7065	41.2065
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del.	....	51.28-51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	52.50	53.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	49.40	49.90	50.40	....
Ironton, Utah, furnace	47.00	47.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	50.00	50.50	51.00	....
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base) .$59.50

6.51-7.00	60.75	9.01- 9.50	67.00
7.01-7.50	62.00	9.51-10.00	68.25
7.51-8.00	63.25	10.01-10.50	69.50
8.01-8.50	64.50	10.51-11.00	70.75
8.51-9.00	65.75	11.01-11.50	72.00

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $84.75 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Piglets, Si 16%, $91, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central furnace, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Inches Diam.	Length	Cents per lb. f.o.b. plant
	Graphite	
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
	Carbon	
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace	$13.50-15.50
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60
Oven Foundry Coke	
Kearney, N. J., ovens	$22.00
Everett, Mass., ovens.	
New England, del.‡	23.35
Chicago, ovens	20.40
Chicago, del.	†21.85
Detroit, del.	24.16
Terre Haute, ovens	20.20
Milwaukee, ovens	21.15
Indianapolis, ovens	20.85
Chicago, del.	24.19
Cincinnati, del.	23.66
Detroit, del.	24.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	21.05
Swedeland, Pa., ovens.	21.00
Portsmouth, O., ovens.	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.75
Flint, del.	22.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens
(Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens (Effective as of Oct. 1)	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50
(Effective as of Oct. 25)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Ahtens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Besemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa. $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)

Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

48-50%, duty paid, f.o.b. cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 67.60c-72.60c.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50

Brazilian—nominal

44% 2.5:1 lump	$33.65

Rhodesian

45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Molybdenum

Sulphide conc., lb. Mo., cont., Mines	$0.90

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅝" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅝"-¾"	Floor ⅝" & Thicker
New York (city)	6.00	6.66	7.40	5.92	...	5.77	6.56	8.68	5.53	5.90	7.36
New York(c'try)	5.80	6.46	7.20	5.72	...	5.57	6.36	8.48	5.33	5.70	7.16
Boston (city)	6.10	6.70	8.00	6.10	...	5.67	6.42	8.72	5.57	5.95	7.40
Boston (c'try)	5.95	6.55	7.85	5.95	...	5.52	6.27	8.57	5.42	5.80	7.25
Phila. (city)	5.72	6.64	7.53-7.58	5.60	...	5.55	6.34	8.40	5.25	5.53	6.74
Phila. (c'try)	5.57	6.59	7.38-7.43	5.45	...	5.40	6.19	8.25	5.10	5.38	6.59
Balt. (city)	5.46†	6.36	7.26	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)	5.31†	6.21	7.11	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va.	5.80	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse)	5.84-6.00	...	...	5.90	...	5.91-5.95	6.61	...	5.85-5.89	6.05-6.09	7.50-7.54
Buffalo (del.)	5.00	6.05	7.85	5.49	6.50	5.20	6.05	10.13	5.25	5.50	7.06
Buffalo (w'hse)	4.85	5.90	7.70	5.34	6.35	5.05	5.90	9.98	5.10	5.35	6.91
Pitts. (w'hse)	4.90§	5.75[8]	7.15	5.10	6.00	4.90	5.65	9.60	4.90	5.05-5.10	6.55
Detroit (w'hse)	4.85-5.00§	5.75-5.85[8]	7.15	5.00-5.35	5.95-6.00	5.45	6.17	8.12	5.45	5.65-5.80	7.10
Cleveland (del.)	5.13-5.90‡‡	5.90-6.31	7.40-8.10‡‡	5.18-5.31	6.40-6.65	5.32-5.36	6.05	8.24-8.40	5.35-5.62	5.52-5.56	6.95-7.01
Cleve. (w'hse)	4.98-5.75	5.75-6.16	7.25-7.95	5.03-5.16	6.25-6.50	5.17-5.21	5.90	8.24-8.25	5.21-5.47	5.37-5.41	6.80-6.86
Cincin. (w'hse)	5.29	6.14	7.63	5.55	6.10	5.55	6.10	...	5.40	5.64	6.94
Chicago (city)	5.20	5.90‡[8]	7.20	5.00	6.67-6.83	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75‡[8]	7.05	4.85	6.52-6.68	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee(city)	5.38	6.08‡[8]	7.38	5.18	6.82-7.01	5.23	6.03	8.43[9]	5.23	5.43	6.88
St. Louis (del.)	5.34§	6.24[8]	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse)	5.19§	6.09[8]	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66-6.83	...	5.15	5.40	7.41-7.73[20]
Birm'ham(c'try)	5.05§	...	6.45	5.05	...	5.00	6.51-6.68	...	5.00	5.25	7.26-7.58[20]
Omaha, Nebr.	6.10-6.35	...	10.04	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60§	8.05	8.90†	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)	6.45§	7.90	8.75†	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco	5.95[21]	7.15	8.05	6.75[21]	8.25[18]	5.90[21]	7.55	10.20‡‡	5.90	7.60	8.10
Seattle-Tacoma	6.35[17]	7.90[8]	8.40	6.70[17]	...	6.20[17]	8.15[1]	9.45[3]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 39,999 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—400 to 14,999 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [16]—2000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb; [23]—Price (but not other price in range) applies to any and all quantities.

• Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § 18 gage and heavier; •• as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter	37 off
⅞-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. f.o.b. A.S. Reg. and Light	Heavy
7/16-in. and smaller	41 off	.....
½-in. and smaller	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6-in. and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
7/16-in. and under	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers..Net to $1 off

FERROALLOY PRODUCT PRICES

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base Price: $165, Rockwood, Tenn.; $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $163, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload, 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, F.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c- 28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

(Please turn to Page 174)

Prices on Copper and Lead Decline

Electrolytic eases to range of 23.25c to 23.50c on reduction made by custom smelter while lead drops to range of 16.80c to 16.85c. Zinc and tin remain unchanged

New York—Weakness in primary copper and lead markets featured the nonferrous metal market last week. Copper eased to the basis of 23.25c to 23.50c delivered Connecticut, for electrolytic; lead eased to a range of 16.80c to 16.85c, St. Louis; zinc held at the 16.00c level. Tin held at $1.03.

Copper—A leading custom smelter reduced the price for electrolytic copper to the basis of 23.25c, delivered Connecticut Valley points, effective on all shipments to be made in April, May and June. This action followed recent sharp reductions in refiners' buying prices for copper scrap. The decline in electrolytic copper was the first change in domestic copper prices since July-August, 1948, when the market was advanced to the 23.50c level.

Consensus in the mine producer circles is that their price levels are not immediately endangered since domestic demands plus deliveries to be made on government account for stockpiling are still well in excess of supplies.

Effective as of Mar. 24, Revere Copper & Brass Inc. and Bridgeport Brass Co., revised prices on certain grades of brass sheets, wire and rods, seamless tubes, and scrap allowance on yellow brass, copper and yellow brass turnings.

Consumption of copper by fabricators during February declined about 17,300 tons to a total of 94,224 tons. This is the smallest consumption reported since August, 1947, and reflects the reduced rate of operations currently in effect among the brass mills. Deliveries to fabricators from primary producers totaled 98,611 tons, or about 4400 tons above consumption. The quantity of copper contained in products sold by fabricators dropped about 30,000 tons to a total of only 65,812 tons, the smallest to be reported in several years and well below the monthly average of any year since 1938.

Stocks of refined copper in fabricators' hands on Feb. 28 totaled 367,872 tons, an increase of about 3200 tons. Unfilled orders at the close of February totaled 272,575 tons, a decline of 28,400 tons since Jan. 1 of this year. The deficit in the consumers' sales position has been reduced from 149,424 tons on Jan. 31 to 106,779 tons at the end of February.

Brass and Bronze Ingots—Leading producers of brass and bronze ingots have reduced prices in order to bring that market into closer relationship with existing conditions in allied markets. Price cuts ranged from 1 to 2 cents a pound on all alloys. Prices in the 85-5-5-5 and 80-10-10 groups were reduced 1.50 cent per pound; all items in the 88-10-2 group, 2 cents; ingots in the yellow and miscellaneous groups, 1 cent a pound. New bookings in the brass and bronze ingot industry continue light.

Lead—St. Joseph Lead Co. reduced prices 1 cent to the basis of 16.80c a pound, St. Louis, on Wednesday, meeting the price reduction which had been made Monday by American Smelting & Refining Co. This made the market 16.80c to 16.85c, St. Louis. Consumers showed no additional buying interest at the new price levels, preferring to draw heavily on inventories. Battery makers are expected to enjoy a good volume of business starting in May which indicates that they may be more active in the market soon.

Producers of lead products reduced their prices in line with the reduction in primary metal.

Metal Price Averages For March

Electrolytic Copper, del. Conn.	23.486
Lead, St. Louis	18.825
Prime, Western Zinc, E. St. Louis	17.056
Straits Tin, New York	103.000
Primary Aluminum Ingots, del.	17.000
Antimony, f.o.b. Laredo, Tex.	38.500
Nickel, f.o.b. refinery	40.000
Silver, New York	71.500

Zinc—With the slab zinc market firmly established at the 16-cent level, producers of sheet, strip, and other allied products reduced their prices last week. Sheet and strip zinc have been reduced to the base of 20.50c a pound and 19.25c a pound, respectively. While some business was done in the slab zinc market on the basis of 16.00c, overall demand from domestic consumers continued light.

Tin—According to trade reports here, many consumers of tin say they still do not have need for the amount of metal which the Office of Domestic Commerce is prepared to allocate to them. Consumption has declined and users are drawing more heavily on their inventories. Jobbers report that retail demands have dropped sharply and that few of the buyers who are entitled to obtain two tons a month are availing themselves of their rights. Prices held steady, of course, on the basis of $1.03 for Straits spot.

Storage Battery Prices Cut

Cleveland—Willard Storage Battery Co., this city, announced a reduction in prices of automotive storage batteries for the replacement market amounting to $1.50 on a popular-sized model, effective as of Apr. 1. The company said the reduction reflects the recent drop in the price of lead.

The reduction will make the price of Willard's HW-1100 model battery used in passenger car automobiles $22.45 each compared with $23.95, the company said. Reductions on other larger types of automotive storage batteries will range as high as $2, the company said.

New Brass Mill Opens Apr. 19

Los Angeles—The new mill of Revere Copper & Brass Inc. here will be opened officially on Apr. 19. This is the company's first mill west of the Mississippi. Built on a 13-acre site at cost of $3 million, the plant is expected to produce at least 1 million pounds of copper rods and tubes per month.

New Rolling Mill Completed

Bettendorf, Iowa—Aluminum Co. of America has virtually completed its giant sheet and plate rolling mill, located east of this city, and has started operations. E. B. Fassel, works manager, has announced that the mill will be limited to about 30 per cent of capacity for the next six months because of the existing shortage of aluminum. The mill can produce sheets up to 92 inches wide.

Reynolds Opens New Pot Line

Louisville, Ky.—Reynolds Metals Co., this city, has obtained sufficient power to open a new pot line at its Jones Mill, Arkansas, and production will begin immedately, according to David P. Reynolds, vice president and general sales manager.

First deliveries from the new pot line will provide sufficient aluminum for the production of about 2 million pounds of aluminum cable, steel reinforced (ACSR) per month in April, May and June. Reynolds plans to continue deliveries at that rate, or more, for the balance of 1949.

This means that rural electric cooperatives all over the country can expand their service facilities now instead of waiting until 1950 or later as originally scheduled.

Distribution of this new supply of ACSR conductor will be handled by the Wisconsin Electric Cooperative, Madison, Wis. All REA cooperatives who had approved orders and deposits in by Mar. 20 are scheduled to receive cable in April. All REA cooperatives who send in approved orders and deposits in April will in turn be scheduled to receive May deliveries.

Mr. Reynolds said that a contract had been signed with the Arkansas Power & Light Co., for sufficient power to open the new pot line at the plant located near Hot Springs, Ark.

The reduction plant has a total annual capacity of 144 million pounds of aluminum, but due to power shortages Reynolds has been able to operate only two of the four pot lines there since the close of the war.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 23.25-23.50c, Conn. Valley; Lake, 23.62½c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 18.00-18.50c; 88-10-2 (No. 215) 27.50c; 80-10-10 (No. 305) 23.75c; No. 1 yellow (No. 405) 15.00-16.00c.

Zinc: Prime western 16.00c, brass special 16.25c, intermediate 16.50c, East St. Louis; high grade 17.00c, delivered.

Lead: Common 16.80-16.85c; chemical and corroding 16.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloy (6-6 type) 19.00-19.50c; No. 12 foundry alloy (No. 2 grade) 18.00-18.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.00c; grade 2, 19.50c; grade 3, 18.50c; grade 4, 17.50c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $88-$94 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.65 per lb for 550 lb (keg); $1.67 per lb for 100 lb (case); $1.72 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.50c per ounce.

Platinum: $72-$75 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 37.18; yellow brass 34.10; commercial bronze, 95%, 37.16; 90%, 36.73; red brass, 85%, 35.79; 80%, 35.37; best quality, 34.92; nickel silver, 18%, 46.62; phosphor-bronze, grade A, 5%, 56.05.

Rods: Copper, hot rolled 33.03; cold drawn 34.28; yellow brass, free cutting, 28.63; commercial bronze, 95% 36.85; 90% 36.42; red brass, 85% 35.48; 80% 35.06.

Seamless Tubing: Copper 37.22; yellow brass 37.11; commercial bronze 90% 39.39; red brass 85% 38.70; 80% 38.28.

Wire: Yellow brass 34.39; commercial bronze, 95% 37.45; 90% 37.02; red brass, 85% 36.08; 80% 35.66; best quality brass 35.21.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 29.42½c, l.c.l. 29.92½-30.05c; weatherproof, f.o.b. eastern mills, c.l. 29.60-29.85c, l.c.l. 30.35c; magnet, delivered, c.l. 32.75-33.50c, 15,000 lb or more 33.00-33.75c, l.c.l. 33.50-34.25c.

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $22.00 per cwt.; add 50c per cwt., 10 sq ft to 140 sq ft. Pipe: Full coils, $22.00 per cwt; cut coils, $22.00. Traps and Bends: List price plus 58%.

ZINC

Sheets, 20.50c, f.o.b. mill, 36,000 lb and over, Ribbon zinc in coils, 19.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 18.25c; over 12-in., 19.25c.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c, Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb. 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar. Ave.	23.486	18.825	17.056	103.00	17.00	38.50	40.00	71.50
Feb. Avg.	23.50	21.235	17.50	103.00	17.00	38.50	40.00	70.838
Mar. 1-7	23.50	21.30-21.35	17.50	103.00	17.00	38.50	40.00	71.50
Mar. 8-12	23.50	19.30-19.35	17.50	103.00	17.00	38.50	40.00	71.50
Mar. 14-15 ...	23.50	17.85-19.30	17.50	103.00	17.00	38.50	40.00	71.50
Mar. 16-22 ...	23.50	17.80-17.85	17.50	103.00	17.00	38.50	40.00	71.50
Mar. 23-26 ...	23.50	17.80-17.85	16.00	103.00	17.00	38.50	40.00	71.50
Mar. 28	23.50	16.85-17.80	16.00	103.00	17.00	38.50	40.00	71.50
Mar. 29 ..	23.25-23.50	16.85-17.80	16.00	103.00	17.00	38.50	40.00	71.50
Mar. 30-31	23.25-23.50	16.80-16.85	16.00	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27 50c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 33.84c; oval 33.34c; electrodeposited, 31.09c; cast, 30.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,900 lb, 17.00c, f.o.b. Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c. Prices f.o.b Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 42.50c, f.o.b. Cleveland; 43.00c, Detroit; 42.00c, f.o.b. Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00c; in 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.125	21.125	20.375
Yellow brass	18.375	18.125	17.500
Commercial Bronze			
95%	20.125	19.875	19.375
90%	20.000	19.750	19.250
Red Brass			
85%	20.000	19.750	19.250
80%	19.875	19.625	19.125
Best Quality (71-79%)	19.750	19.500	19.000
Muntz Metal	18.250	18.000	17.500
Nickel, silver, 10%...	20.250	20.250	10.125
Phos. bronze, A.....	22.625	22.375	21.375
Naval brass	18.750	18.500	18.000
Manganese bronze ...	18.750	18.500	17.875

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, f.o.b. shipping joint, carload lots)

No. 1 copper 16.00, No. 2 copper 15.00, light copper 14.00, composition red brass 12.00-12.25, auto radiators 10.50-10.75, heavy yellow brass 9.00-9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 16.00, No. 2 copper 15.00, light copper 14.00, refinery brass (60% copper), per dry copper content 14.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 15.50-15.75, No. 2 14.50-14.75, light copper 13.50-13.75, No. 1 composition red brass 10.75-11.00, No. 1 composition turnings 10.25-10.50, mixed brass turnings 7.75-8.00, new brass clippings 14.75-15.25; No. 1 brass rod turnings 9.00-9.25, light brass 6.50-6.75, heavy yellow brass 8.00-8.25, new brass rod ends 11.75-12.25, auto radiators, unsweated 9.25-9.50, cocks and faucets 9.50-9.75, brass pipe 9.75-10.00.

Lead: Heavy 10.50-11.00, battery plates 5.00-5.50, linotype and stereotype 12.00-12.50, electrotype 10.50-11.00, mixed babbitt 12.00-12.50, solder joints, 16.00-16.50.

Zinc: Old zinc 7.00-7.50, new die cast scrap 7.50-8.00, old die cast scrap 4.50-5.00.

Tin: No. 1 pewter 64.00-66.00, block tin pipe 82.00-83.00, No. 1 babbitt 48.00-50.00, siphon tops 49.00-51.00.

Aluminum: Clippings 2S 12.00-12.50, old sheets 8.00-8.50, crankcase 8.00-8.50, borings and turnings 4.00-4.50, pistons, free of struts, 8.00-8.50.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt	$32.00-33.00
No. 2 Heavy Melt	30.00-31.00
No. 1 Busheling	32.00-33.00
No. 1 Bundles	32.00-33.00
No. 2 Bundles	29.00-30.00
No. 3 Bundles	27.00-28.00
Heavy Turnings	29.00-30.00
Machine Shop Turnings	21.50-22.50
Mixed Borings, Turnings	21.50-22.50*
Short Shovel Turnings	24.00-25.00
Cast Iron Borings	22.00-23.00
Bar Crops and Plate	35.00-36.00
Low Phos. Steel	35.00-36.00

Cast Iron Grades†

Mixed Yard	34.00-35.00
No. 1 Machinery Cast	38.00-39.00
Charging Box Cast	36.00-37.00
Heavy Breakable Cast	33.00-34.00
Brake Shoe	36.00-37.00

Railroad Scrap

No. 1 R.R. Heavy Melt	37.50-38.50†
Axles	43.00-45.00
Rails, Random Lengths	38.00-39.00*
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	45.00-46.00
Railroad Specialties	41.00-42.00
Angles, Splice Bars	40.00-41.00

* Brokers' buying prices.
† Nominal.

CLEVELAND

Heavy Melt. Steel	$28.00-28.50
No. 1 Busheling	28.00-28.50
No. 2 Bundles	27.50-28.00
Machine Shop Turnings	18.00-20.00†
Mixed Borings, Turnings	23.00-23.50
Short Shovel Turnings	23.00-23.50
Cast Iron Borings	23.00-23.50
Bar Crops and Plate	33.00-33.50
Punchings & Plate Scrap	33.00-33.50
Cut Structurals	35.00-35.50

Cast Iron Grades

No. 1 Cupola	40.00-41.00
Charging Box Cast	38.00-40.00
Stove Plate	36.00-38.00
Heavy Breakable Cast	32.00-33.00
Unstripped Motor Blocks	32.00-33.00
Malleable	36.00†
Brake Shoes	33.00-33.50
Clean Auto Cast	43.00-43.50
No. 1 Wheels	38.00-39.00
Burnt Cast	31.00-32.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
R.R. Malleable	36.00†
Rails, 3 ft and under	38.00-40.00
Rails, Random Lengths	32.00-34.00
Cast Steel	33.00
Railroad Specialties	33.00
Uncut Tires	32.00
Angles, Splice Bars	34.00

† Nominal.

VALLEY

Heavy Melt. Steel	$29.00-29.50
No. 1 Bundles	29.00-29.50
No. 2 Bundles	28.00-28.50
Machine Shop Turnings	19.00-21.00
Short Shovel Turnings	24.00-24.50
Cast Iron Borings	24.00-24.50
Low Phos.	34.00-34.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	31.00

MANSFIELD

Machine Shop Turnings	$19.00-21.00
Short Shovel Turnings	24.00-24.50

CINCINNATI

No. 1 Heavy Melt. Steel	$29.00
No. 2 Heavy Melt. Steel	29.00
No. 1 Busheling	29.00
Nos. 1 & 2 Bundles	29.00
Machine Shop Turnings	18.00
Mixed Borings, Turnings	18.00
Short Shovel Turnings	18.00
Cast Iron Borings	19.00

Cast Iron Grades

No. 1 Cupola Cast	40.00
Charging Box Cast	35.00
Heavy Breakable Cast	34.00
Stove Plate	32.00
Unstripped Motor Blocks	28.00
Brake Shoes	30.00
Clean Auto Cast	40.00
Drop Broken Cast	43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	30.00
R.R. Malleable	31.00
Rails, Rerolling	38.00
Rails, Random Lengths	34.00
Rails, 18 in. and under	43.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 Bundles	$29.00-30.00
No. 2 Bundles	27.00-28.00
No. 2 Heavy Melt. Steel	27.00-28.00
No. 1 Busheling	29.00-30.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	19.00-20.00
Short Shovel Turnings	20.00-21.00
Cast Iron Borings	20.00-21.00
Punchings & Plate Scrap	32.00-33.00

Cast Iron Grades

No. 1 Cupola Cast	31.00-33.00
Heavy Breakable Cast	26.00-28.00
Clean Auto Cast	31.00-33.00

BUFFALO

No. 1 Heavy Melt. Steel	$30.00-31.00
No. 2 Heavy Melt. Steel	26.00-27.00
No. 1 Busheling	26.00-27.00
No. 1 Bundles	26.00-27.00
No. 2 Bundles	24.00-25.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	18.00-19.00
Cast Iron Borings	18.00-19.00
Short Shovel Turnings	20.00-21.00
Low Phos.	31.00-32.00

Cast Iron Grades

No. 1 Cupola	31.00-32.00
Mixed Cast	30.00-31.00
Heavy Breakable	28.00-30.00
Malleable	33.00-35.00
Clean Auto Cast	34.00-35.00

Railroad Scrap

Rails 3 ft. and under	43.00-44.00
Scrap rails	39.00-40.00
Specialties	39.00-40.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$27.00-28.00
No. 2 Heavy Melt. Steel	23.00-24.00
No. 1 Busheling	23.00-24.00
No. 1 Bundles	27.00-28.00
No. 2 Bundles	21.00-22.00
Machine Shop Turnings	17.00-18.00
Mixed Borings, Turnings	14.00-15.00
Short Shovel Turnings	22.00-23.00
Bar Crop and Plate	31.00-32.00
Punchings & Plate Scrap	31.00-32.00
Cut Structurals	31.00-32.00
Elec. Furnace Bundles	28.00-29.00
Heavy Turnings	27.00-28.00
No. 1 Chemical Borings	nom.

Cast Iron Grades

No. 1 Cupola Cast	29.00-30.00
No. 1 Machinery Cast	32.00-33.00
Charging Box Cast	28.00
Heavy Breakable Cast	28.00
Unstripped Motor Blocks	26.50-27.50
Clean Auto Cast	30.00-31.00
No. 1 Wheels	32.00-33.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$21.00-22.00
No. 2 Heavy Melt. Steel	17.00-18.00
No. 1 Busheling	17.00
No. 1 Bundles	20.00
No. 2 Bundles	16.00-17.00
No. 3 Bundles	nominal
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	11.00-12.00
Short Shovel Turnings	13.00-14.00
Punchings & Plate Scrap	20.00-21.00
Cut Structurals	nominal
Elec. Furnace Bundles	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	24.00-25.00
No. 1 Machinery	25.00-26.00
Charging Box Cast	22.00-23.00
Heavy Breakable	22.00-23.00
Unstripped Motor Blocks	20.00-21.00
Malleable	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$22.00-23.00
No. 2 Heavy Melt. Steel	18.00-19.00
No. 1 Bundles	20.00-21.00
No. 1 Busheling	18.00-19.00
Machine Shop Turnings	12.00-14.00
Mixed Borings, Turnings	12.00-14.00
Short Shovel Turnings	16.00-18.00
Bar Crops and Plate	28.00-29.00
Punchings & Plate Scrap	28.00-29.00
Chemical Borings	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast	35.00-36.00
Heavy Breakable Cast	34.00-35.00
Stove Plate	28.00-29.00
Unstripped Motor Blocks	28.00-30.00
Clean Auto Cast	29.00-31.00

CHICAGO

No. 1 Heavy Melt. Steel	$30.00-32.00†
No. 2 Heavy Melt. Steel	28.00-30.00
No. 1 Bundles	29.00-31.00
No. 2 Bundles	26.00-27.00
No. 3 Bundles	23.00-24.00
Machine Shop Turnings	17.00-18.00
Mixed Borings, Turnings	17.00-18.00
Short Shovel Turnings	17.00-18.00
Cast Iron Borings	17.00-18.00
Bar Crops and Plate	33.00-35.00
Punchings	33.00-35.00
Elec. Furnace Bundles	32.00-33.00
Heavy Turnings	28.50-29.50
Cut Structurals	34.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	34.00-35.00
Clean Auto Cast	34.00-35.00
No. 1 Wheels	33.00-35.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	33.00-34.50†
Malleable	34.00-35.00
Rails, Rerolling	39.00-40.00
Rails, Random Lengths	33.00-34.00
Rails, 3 ft. and under	40.00-41.00
Rails, 18 in. and under	40.50-41.50
Railroad Specialties	39.00-40.00
Angles, Splice Bars	38.00-39.00

† Top price represents earmarked scrap.

ST. LOUIS

No. 1 Heavy Melt. Steel	$31.00-32.00
No. 2 Heavy Melt. Steel	29.00-30.00
Machine Shop Turnings	17.00-18.00
Short Shovel Turnings	17.00-18.00

Cast Iron Grades

No. 1 Cupola Cast	36.00-38.00
Charging Box Cast	31.00-32.00
Heavy Breakable Cast	29.00-30.00
Brake Shoes	30.00-31.00
Clean Auto Cast	36.00-38.00
Burnt Cast	31.00-32.00

Railroad Scrap

R.R. Malleable	30.00-31.00
Rails, Rerolling	38.00-40.00
Rails, Random Lengths	32.00-33.00
Rails, 3 ft. and under	37.00-38.00
Uncut Tires	34.00-35.00
Angles, Splice Bars	34.00-35.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$29.00
No. 2 Heavy Melt. Steel	29.00
No. 1 Busheling	29.00
No. 2 Bundles	27.00
Long Turnings	24.00
Short Shovel Turnings	24.50
Cast Iron Borings	24.50
Bar Crops and Plate	35.00
Cut Structurals	36.00

Cast Iron Grades

No. 1 Cupola Cast	41.00-42.00
Stove Plate	38.00-39.00
No. 1 Wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	32.50
R.R. Malleable	nominal
Rails, Rerolling	41.00-43.00
Rails, Random Lengths	38.00-40.00
Rails, 3 ft. and under	40.00-42.00
Angles and Splice Bars	40.00-42.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$25.00
No. 2 Heavy Melt. Steel	*25.00
No. 1 Busheling	*25.00
Nos. 1 & 2 Bundles	*23.00
No. 3 Bundles	*20.00
Machine Shop Turnings	*15.00
Bar Crops and Plate	*25.00
Cast Steel	*25.00
Alloy Free Turnings	*15.00
Cut Structurals	*25.00

Cast Iron Grades

No. 1 Cupola Cast	35.00

Railroad Scrap

No. 1 Heavy Melting	*26.00
Wheels	*29.50
Rails, Random Lengths	*26.50

*F.o.b. California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
No. 1 Busheling	22.50
Nos. 1 & 2 Bundles	23.00
No. 3 Bundles	20.00
Machine Shop Turnings	15.00-20.00
Mixed Borings, Turnings	15.00-20.00
Punchings & Plate Scrap	30.00-35.00
Cut Structurals	30.00-35.00

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00
Heavy Breakable Cast	25.00
Stove Plate	25.00-27.50
Unstripped Motor Blocks	25.00
Malleable	25.00
Brake Shoes	25.00
Clean Auto Cast	27.50
No. 1 Wheels	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00
Railroad Malleable	25.00
Rails, Random Lengths	25.00
Angles and Splice Bars	22.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$25.00
No. 2 Heavy Melt. Steel	25.00
Nos. 1 & 2 Bundles	23.00
No. 3 Bundles	20.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.50-16.00
Punchings & Plate Scrap	33.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	$30.00-35.00

HAMILTON, ONT.

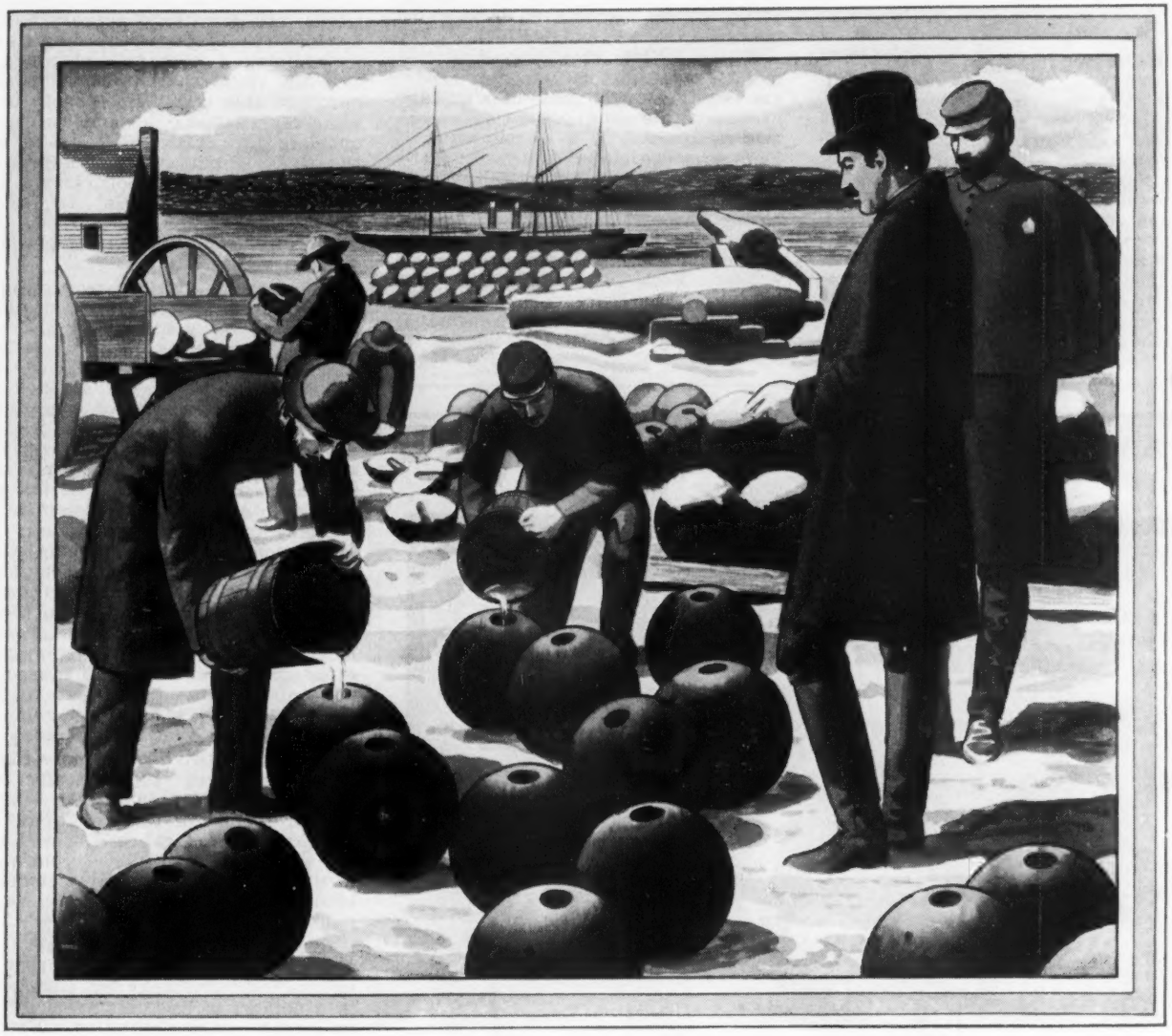
(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00
No. 2 Cast	44.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



CIVIL WAR SCRAP

Making cast scrap from 24 inch cannon balls was strictly a winter job, during the Civil War when the secret weapon of the North was the cast iron Columbiad Cannon. Holes in the balls would be filled with water at night and a freeze would shatter them by morning.

The importance of Scrap in the nation's economy was as important then as now.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

Main Office

LINCOLN-LIBERTY BLDG.
Philadelphia 7, Pennsylvania

Yards

LEBANON, PA. • READING, PA.
DETROIT (ECORSE), MICH.
MODENA, PA. • PITTSBURGH, PA.

Branch Offices

BIRMINGHAM, ALA. Empire Bldg.
BOSTON, MASS. Statler Bldg.
BUFFALO, N.Y. Genesee Bldg.
CHICAGO, ILL. 100 W. Monroe St.
CLEVELAND, O. 1022 Midland Bldg.
DETROIT, MICH. 2011 Book Bldg.
HOUSTON, TEXAS Cotton Exchange
LEBANON, PA. Luria Bldg.
NEW YORK, N.Y. Woolworth Bldg.
PITTSBURGH, PA. Oliver Bldg.
PUEBLO, COLO. Colorado Bldg.
READING, PA. Luria Bldg.
ST. LOUIS, MO. 2110 Railway Exchange Bldg.
SAN FRANCISCO, CAL. Pacific Gas & Elec. Co., Bldg.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets, Strip . . .

Sheet Prices, Page 152

Pittsburgh—Demand for galvanized and hot and cold-rolled sheets and strip remains well in excess of current production schedules. However upward trend in order cancellations and deferment of shipments is noted and there are some sellers who freely predict abandonment of mill allotment distribution of flat rolled items before close of third quarter.

Carnegie-Illinois, effective March 28, adopted pattern initiated by Armco sometime ago allowing consumers to combine following widths and lengths in respect to quantity discount schedules on stainless sheets and other stainless products: Widths of 24, 30, 36, 38, and 60 inches; in lengths of 96, 120 and 144 inches.

Boston—While sheet and strip demand is off, second quarter needs are clarifying with some new buying in line with lower inventories which now range from 50 to 60-day supply. Deliveries are closer to schedule, although in the case of hot-rolled carbon sheets some producers continue to lag. Disposal of unwanted tonnage from consumer inventories by resale at mill prices is usually successful.

New York—Sheet demand has shown little change over the past couple of weeks. Although demand is definitely easier than it was a month ago, local sellers see little further easing at this time. In other words, the downtrend appears to be leveling off. Producers of sheets are maintaining a high rate of production and claim that, while there are openings as a result of cutbacks and some cancellations, demands in other quarters are sufficient to take up the slack. Producers generally look for continued high operation for some weeks to come. In fact, some leading mills doubt if there will be any real balance between supply and demand before late this year.

Philadelphia—Little sheet tonnage, in the major grades and at reasonable price, is going begging. Yet, there are instances of gray market tonnage being offered at below mill levels, traders taking a sharp licking in an effort to dispose of what they have on hand. One district trader, who has been active in the premium market, is now offering hot and cold sheets in miscellaneous assortments at 3.00c. Also, one midwestern mill, virtually out of the market here for many months, is again offering strip and a limited tonnage of sheets. The leading eastern producer has more tonnage for sale, and, in fact, there are few sellers of hot and cold sheets, local or inland, who are either not offering more tonnage or holding out hope of being able to do so within the relatively near future.

Chicago—With decline in zinc prices, the two local galvanized sheet producers automatically reduced coating extras effective Mar. 24, the amount of the reductions being governed by gages. Demand for the product at mill level continues in excess of supply despite decidedly lessened pressure at some warehouses.

Cincinnati—Pressure for sheet tonnage in excess of district output is maintained. Cutbacks by customers in a number of end uses are creating an easier supply situation. Nature of ordering reflects desire of sheet users to hold down inventories. Galvanized sheet prices are automatically lower on the zinc cost decrease.

Birmingham — Despite increased sheet production from Tennessee Coal, Iron & Railroad Co.'s new cold reduction mill at Fairfield, Ala., demand still is considerably in excess of supply. A few scattered cancellations are not of sufficient consequence to change the general situation.

St. Louis—Sheet demand continues to soften in this district, except for galvanized roofing and other farm-allied products. For every cancellation, however, there are two takers, which leads to the belief locally demand will outrun supply the remainder of the year. Granite City Steel Co., which is now concentrating on cold-rolled sheet products, let a contract last week for construction of a fourth big open-hearth furnace, to be completed in November. Its 120,000 ton annual ingot capacity will raise the plant's total to 740,000 tons.

Los Angeles—Demand for flat-rolled products in general remains strong, although increasing spottiness is apparent. Consumers are not yet able to get all the cold-rolled sheet they need, but some categories of low alloy sheets are now in good supply.

Now New design for precision boring of small, long, concentric holes without taper

Here's a new development in tools that enables you to bore small diameter holes to extreme depth with precision. Here's a boring tool with great rigidity. Cutting heads and shanks are made of two different grades of carbide. Shank diameters range from ½" to ½". Here is the last word in precision boring—rendering still more valuable the recognized features of Bokum Boring Tools which (1) retain clearance throughout life, (2) require resharpening only on face.

Send for Bulletin D-948

TRADE MARK REG. U. S. PAT. OFF.

BOKUM TOOL CO.

14775 WILDEMERE AVE. · DETROIT 21, MICH.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

Steel Bars . . .

Supply of some specifications remains scarce, but outlook is easier

Bar Prices, Page 152

New York—Despite a general easing in hot carbon bars, some specifications continue extremely scarce, such as large rounds 3 inches and up, small flats and small bar shape angles. Sizes in more easy supply include rounds from ½-inch up to 2½ to 3 inches. Most producers, while having already set up their consumer quotas for second quarter on more or less the same basis as for first quarter, indicate they may be able to increase allotments once the new quarter gets under way.

There have been various suspensions and, while for the most part tonnage has been readily diverted to other consuming channels, the outlook is easier. For instance, bolt and nut makers are shipping more tonnage than they are booking, with a result that their backlogs are steadily being reduced and their pressure for steel less pronounced. Some have already held up on certain tonnage scheduled originally for shipment in late April and May.

Cold-drawn carbon bar requirements also continue to ease. Most cold drawers are not alarmed about the possibility of keeping operations at a good level throughout the new quarter; nevertheless, they have gaps in their schedules at this time which they will have to fill in.

Hot and cold alloy bars continue in restricted demand in this district.

Boston—More ex-quota hot-rolled carbon bar tonnage is appearing and one leading seller in this area has reduced prices $4 a ton, or to a competitive level with others in the Pittsburgh district. With this ex-quota tonnage mills employ varying policies in distribution; some are holding regular customers to approximate allocations and courting new accounts with additional volume while others follow a reverse policy. In this background lurks influence of f.o.b. mill selling; this change in distribution is becoming of increasing importance as supply equals demand in bars and other products. Bolt and nut order volume is off sharply, but as most consumers in this group have been operating with relatively low allocations, slackening in bar demand is not fully reflected.

Pittsburgh—Jones & Laughlin Steel Corp. reduced merchant carbon bar prices 20 cents to $3.35 per 100 pounds, effective March 28, or to a competitive price basis with leading producers. Company continues to quote cold-finished carbon bars at $1 per ton below competitors. June tonnage requirements for alloy and merchant carbon bars under voluntary allocation program have been sharply reduced.

Philadelphia—Hot carbon bar demand is increasingly spotty. Openings in mill schedules are not being readily filled in various instances, and producers are having to draw more on backlogs in order to sustain operations. Indicative of this easing situation, a leading eastern producer is again rolling bands, a light product and, therefore, less profitable than many bar sizes that can be rolled on the same equipment. Inland producers are driving for more tonnage here with one Pittsburgh producer having reduced prices $4 a ton.

Cleveland—Although some users of hot-rolled carbon bars are reducing their requirements, others stand ready to take any additional tonnage available. As a result, one leading producer still finds demand exceeds its ability to supply. That company's order books are filled through the second quarter but it has not yet opened third-quarter books. Despite a high rate of production, that company could not deliver all orders scheduled for March shipment and has carried a sizable tonnage over into April.

Chicago—More effort has to be expended to plug the holes which have opened up in rolling mill schedules for latter part of the new quarter. With railroad car builders, forge shops, machine tool producers and other leading bar consumers trimming requirements in line with lower volume of new business, some doubts are raised as to how long overall demand will be strong enough to keep books filled.

Los Angeles—Reduced activity of farm implement manufacturers has depressed the demand for steel bars. Requirements of warehouses, however, remain substantial and reflect continued specifying on the part of many small users.

PRODUCTION BOOSTERS

Ever present in improperly safeguarded hydraulic systems is the threat of excessive oil temperature. It can be responsible for damage or malfunction of precision-made controls, or it can bring about substantial (often unnoticed) production losses.

Denison Engineering Co. (25-50 ton straightening press shown) is a firm believer in the Ross "BCF" Exchanger for safeguarding the oil temperature in hydraulically operated equipment. For it's generally accepted that any hydraulic system, Ross "BCF" equipped, is properly safeguarded against . . .

- Excessive pump slippage and leakage
- Accelerated breakdown of oil
- Formation of harmful sludges and varnishes

With pumping output thus increased, full-capacity, full-efficiency press operation is assured. Yes, "BCF" Exchangers are production boosters for any hydraulic system.

★ *ILLUSTRATED CATALOG*

A brief request on your letterhead will bring Bulletin 1.1K1 to your desk . . . with the complete story of fully standardized, mass-produced "BCF" Exchangers.

ROSS

ROSS HEATER & MFG. CO., INC.

Division of American Radiator & Standard Sanitary Corporation

1431 WEST AVE. BUFFALO 13, N. Y.

In Canada, Horton Steel Works, Ltd., Fort Erie, Ont.

"BCF" EXCHANGERS

Serving home and industry— AMERICAN-STANDARD • AMERICAN BLOWER CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

Plates . . .

Plate Prices, Page 153

New York—Easing requirements from railroads and fabricators of light tanks are contributing to a generally better supply of plates, although they still are among the more stringent products. Light tank work may take an early turn for the better but little improvement is in sight with regard to railroad needs. There is less pressure also from shipyards, with no immediate improvement ahead. Consequently, plate producers are scouting more actively for tonnage and in most instances are no longer restricting sales to their regular customers. Moreover, they are more interested in building up backlogs for shipment beyond the second quarter. Until recently plate makers generally have refused to accept business, except where identified with long term projects.

At the same time, though, most plate producers are still behind on commitments, at least to the extent of a couple of weeks or so, and report continued active demand in certain lines, particularly for pressure tank fabrication. Also, there is still a tremendous tonnage in prospect for fabricated line pipe. With the possibility now that steel may be available within reasonable time, various pipe projects are beginning to come to life which heretofore were very much in the background.

Pressure for plates in general is easing, but producers nevertheless anticipate good operations for several months to come. They may have to work harder for tonnage, but they believe that the potential market is still good.

Philadelphia—Easing pressure for plates is affecting sales policies in more ways than one. There is not only a most active solicitation of tonnage, but certain mills are no longer insisting that orders include tonnage involving extra premiums and the Harrisburg, Pa., producer has reduced its base from 6.50c to 4.95c, mill, effective Apr. 1. This price, however, still represents a premium over the base prices of other eastern mills.

District plate rolling operations are being fairly sustained and open-hearth operations, as applied to plates, are about the same. A few furnaces have been taken off because of a decline in special conversion work, but the overall effect insofar as plate rolling is concerned has been slight so far. As a matter of fact, production of furnaces in operation has actually been stepped up in some cases by use of a greater amount of pig iron, which now is in better supply. At certain plants, some ingots are now being accumulated, indicating the possibility of a further reduction in steel output as time goes on.

Chicago—Indicated easing in plate supply by midyear as the result of curtailment of several voluntary allocation programs is discounted by one district producer on the basis of the schedules already in hand. Apparently, with a sizable portion of the preferential industries located in this region, demand contraction will be much less pronounced here than in other localities, freight charges ruling out the long-distance hauls required when demand was at its peak. The company now has somewhat more than its share of the allocated tonnage as determined by its relation to the rest of the industry, and this disproportionate ratio apparently is being increased under the new tonnage disposition.

Birmingham—Some available plate tonnage, chiefly in small lots, has not been taken in the past week. Cutbacks are not large, but they do occur irregularly. It will take considerably more of that and of cancellations to equalize production and demand in this territory. Car production at Bessemer continues slack.

Los Angeles—Fabricators of large-diameter pipe generally are booked heavily, with a substantial proportion of tonnage for export. Plates are by far the tightest steel product in the West, and are likely to remain stringent long after other items are in plentiful supply. Although delivery time is somewhat improved, one plate producer still is quoting 12 months or more.

San Francisco—Shortages continue to make plates a "critical" item. Some fabricators are reducing demand for light gages, but overall needs remain greater than the supply. Heavy plates are the tightest of all steel products, a situation that's not expected to change in the foreseeable future. Utilities, pipeline companies and oil firms are still competing actively for heavy material.

5 WAYS
that
IT PAYS to
choose NOTTINGHAM
KAISER ALUMINUM PRODUCTS • UNION DRAWN COLD FINISHED BARS • PENN METAL EXPANDED METAL
BABCOCK & WILCOX TUBING • BETHLEHEM WIRE ROPE • SHEET • STRIP • PLATE • FLOOR PLATE • STRUCTURAL
HOT ROLLED CARBON AND ALLOY BARS • STRUCTURAL PIPE • SLITTING • SHEARING • FLAME CUTTING
FIRST—You save on inventory. You don't tie up your capital and valuable floor space with large stocks. Our material is as near to you as your telephone.
SECOND—You save time by ordering from us... delivery service is always prompt on stock items.
THIRD—You simplify your purchasing and bookkeeping problems by using this one source of supply. With our wide variety of products, everything you require is here under one roof.
FOURTH—You save on production. We can supply you the correct size for your fabricating operations through our slitting, shearing and cutting departments.
FIFTH—You save on material. Our engineers will recommend the proper material to use for a particular job... saving you money in time and material.
Work with Nottingham and lower your costs!
NOTTINGHAM STEEL
SPEEDEE
THE NOTTINGHAM MAN
Write for Stock List
THE NOTTINGHAM STEEL CO.
WAREHOUSES:
CLEVELAND P.O. Box 5787, 4510 Division Ave.
DETROIT (Steel Products Corp.) 14001 Intervale Ave.
CHICAGO 5921 S. Western Ave.
Call ATlantic 5100 FOR SPEEDEE SERVICE
YOU LOWER STEEL PURCHASING • MANUFACTURING • HANDLING • ENGINEERING EXPENSE
when you Work with Nottingham . . . Let us work with you!

Tubular Goods . . .

Large producer withdraws consigned stocks with jobbers as inventory control measure

Tubular Goods Prices, Page 153

Boston—Distributors of merchant steel pipe are accumulating stocks at a better rate; some blanket orders placed by utilities, contractors and industrial users have been canceled and jobber backlogs are declining. Loss has been heaviest from consumers normally buying from mills who are again purchasing directly. One large producer has withdrawn consigned stocks as of Mar. 31, being the last important interest to make this move. Three months protection is afforded current stocks, but new shipments from Mar. 31 are billed as shipped. This portends closer control of jobber inventories. Mills are seeking orders for tubular specialties, including stainless, alloys and some electric welded.

Philadelphia—Soil pipe producers are curtailing schedules sharply. At least one large eastern maker, which only recently contemplated a five-day week production through April, is now planning a schedule of only two or three days a week. Reports of sharp revisions in soil pipe prices in the West, one interest being said to have just reduced quotations $15 a ton, have given district makers the jitters. Most makers have fair to substantial stocks of pipe on hand and under present easing conditions are now planning to work off some of this inventory first, reducing their operations meanwhile.

Cleveland — Demand-supply balance in most grades and sizes of pipe, except large line pipe, is not far away, according to a leading producer. With reduced demand, less merchant pipe is moving out of warehouse stocks as fast as it is received. Consequently, warehouse stocks are tending to build up and become better balanced. With oil well drilling on a reduced scale, oil country jobbers and consumers are in an increasingly comfortable position concerning supplies of tubular goods.

Dallas—Demand for tubular goods, especially oil field pipe, is definitely easing up in this area—a section that has experienced perhaps the most acute postwar stringency of any in the country. Supplies have been coming through sufficiently for most oil companies to meet their immediate needs, despite the fact that well completions have been running ahead of a year ago. Offerings are increasing and frequently large lots are being turned down, even where obtainable at standard quoted prices. Premium prices have vanished. Second-hand sources that have in the past been contributing to supplies in a large way are generally unable to sell. Some inventory of second hand pipe, bought at high prices, is on hand, and is moving slowly if at all.

Demand for smaller goods, ¾-inch and 1-inch goods, is still comparatively heavy because of continued extensive residential and commercial building activity. Demand tapers off proportionately in the larger sizes.

Los Angeles—Demand for pipe and other steel products from the petroleum industry is perking up as preparations get under way to meet the expected spring and summer increase in motoring. Shell Oil Co., for example, has approved a $33 million capital budget for 1949 Pacific Coast operations. Funds will be used for oil exploration, enlarging terminal facilities, building new service stations, expanding distribution, and for research activities. Shell has nearly completed the first multiple products pipeline in the West, a 17½-mile line from its Wilmington refinery to Los Angeles.

Seattle—Inquiry for cast iron pipe is reviving with improved weather conditions and several sizable projects are pending. Inventories of cast iron goods are low.

Pittsburgh—Additional pipe producers have reduced galvanized pipe prices $3 per ton, equivalent to 1½-point higher discount, in line with action initiated by National Tube to reflect 1½-cent per pound reduction in zinc. Exception to this action is reported by Fretz-Moon Tube Co., Butler, Pa., in reducing ⅛-inch galvanized pipe $1 by raising the discount one-half point, and one point or $2 reduction on ¼- and ⅜-inch pipe.

Some electric weld tubing producers anticipate increased competition. Demand for boiler tubes from railroads has declined.

This is another of the "HUNDREDS OF JOBS" which can be done only on a MARVEL Band Saw!

MARVEL BAND SAW saved these two 4400# castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the $64 question—how to machine out the 1½" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 6½".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model #8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of $3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MARVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many headaches and dollars.

Write for catalog.

These Exclusive MARVEL Features made this job easy

1. Large, T-slotted work table.
2. Blade feeds into work vertically; work always stationary.
3. Power-pressure feed.
4. Automatic Blade tension.
5. Built-in coolant system.
6. Large capacity.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades

See our CATALOG in SWEET'S FILE MECHANICAL INDUSTRIES

ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVE. CHICAGO 39, ILLINOIS

46 years of crane building experience

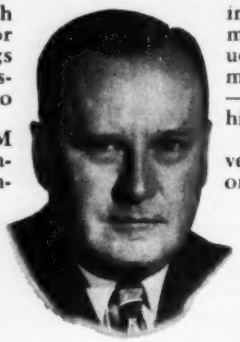
This impressive span of successful enterprise, plus the helpful comments and suggestions from a long line of users, has taught us how to build cranes that emphasize accessibility, rigidity, long life, safety and economy. BEDFORD CRANES are built in any span or lift, 5 to 150 tons capacity, designed and engineered to meet your requirements.

We also do structural steel work and produce gray iron castings.

BEDFORD FOUNDRY & MACHINE CO.
BEDFORD, INDIANA, U. S. A.
Engineers • Designers • Fabricators

"SUPPLYING industry with H-VW-M equipment for electrolytic applications brings up many straightforward questions. This one's duck soup to answer.

"To start with, H-VW-M automatic conveyors are versatile. They can be used for cleaning, pickling, plating, anodizing, bright dipping, or a combination of many different treatments and coatings. There's a size and type for each individual application. In many instances the full automatic type serves best—



"What's so good about H-VW-M AUTOMATIC CONVEYORS?"

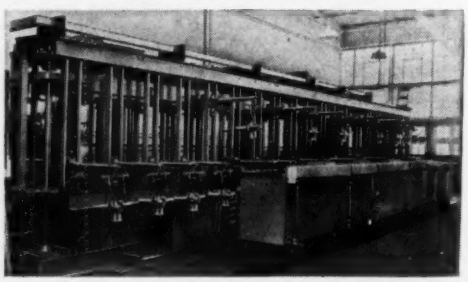
M. J. MOLL, Chief Equip. Sales Engineer, H-VW-M COMPANY

improves working conditions, maintains a high quality product and develops savings that more than justify the investment—even where the work is highly diversified.

"Wherever H-VW-M conveyors—full or semi-automatic, or combinations of both are installed they pay off many ways: Reduce rejects, lessen cost per unit of processed work, noticeably improve uniformity of finished product. Hundreds of H-VW-M conveyors are in successful operation today in many different industries.

For complete information, ask your H-VW-M representative for copies of bulletins FA-103 and SA-101, or write to headquarters.

Hanson-Van Winkle-Munning has supplied the plating industry for over 70 years. Our sales-engineers are thoroughly familiar with every step in the process of electroplating and polishing. It is this overall knowledge that has made H-VW-M "Headquarters" for electroplating and polishing equipment, supplies and technical assistance.



HANSON-VAN WINKLE-MUNNING COMPANY
MATAWAN, NEW JERSEY
Manufacturers of a complete line of electroplating and polishing equipment and supplies
Plants: Matawan, New Jersey • Anderson, Indiana
Sales Offices: Anderson • Chicago • Cleveland • Dayton • Detroit
Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
Pittsburgh • Rochester • Springfield (Mass.) • Stratford (Conn.) • Utica

SINCE 1820

4030

Structural Shapes . . .

Structural Shape Prices, Page 153

Philadelphia — Shape supply continues to ease. Not only do certain of the largest producers now have more tonnage to offer, but in this district the Phoenixville, Pa., mill has greatly curtailed sheet bar production and is getting back into shapes more actively. It has recently established a price of 3.75c, mill, which compares with a price of at least 5.00c on such limited shape tonnage as it would handle some time ago, and with a current price of 3.30c, Bethlehem, Pa., and a minimum Pittsburgh price of 3.25c. While ingot production is curtailed, the company is nevertheless in position to make early deliveries.

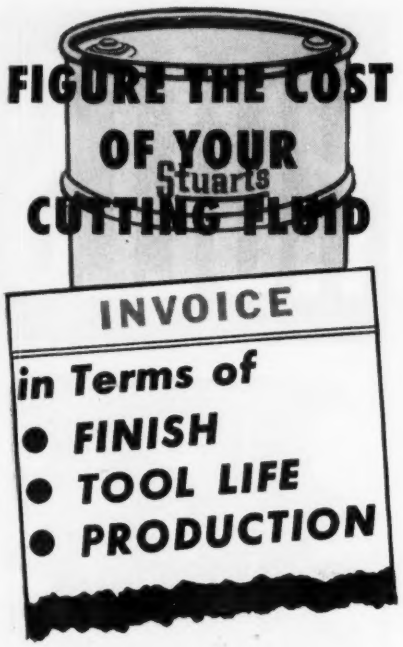
Imported shape tonnage in American warehouses is now being offered at substantial sacrifices by sellers, in certain instances, at below American minimum mill levels. It is reliably estimated that more than 90,000 tons of imported shapes are in storage along the eastern seaboard, much of it from Belgium. Also, in addition, some fairly substantial tonnages are being held in mid-western centers.

Despite freer flow of structurals, stocks at fabricating shops and distributors are still not in proper balance and it may be a while before they are. Certain sizes continue scarce and, moreover, buyers are not rushing to build up stocks, as they are becoming increasingly price conscious. There are certain sizes that buyers would gladly take in, but as for shape tonnage in general they are moving cautiously until they can get a better idea as to where prices are going to wind up.

New York—While some structural fabricators are still booked well ahead, the situation in general is easing. This is due not only to fewer awards, but to better mill shipments. This is enabling shops to increase operations on work already on order. One of the larger fabricators is still unable to offer much under six months; others, including the medium sized shops, are averaging around four to four and one-half months. Most small fabricators can better those delivery promises by anywhere from a month to two months.

Pittsburgh—Announcement is expected momentarily on the estimated structural tonnage to be required for the 32-story skyscraper to be erected in downtown Pittsburgh under the auspices of Mellon interests. The new building will be known as 525 William Penn Place, and construction work was scheduled to commence Apr. 1. This project represents the second skyscraper scheduled to be erected in Pittsburgh over the next two years. Alcoa previously announced plans to erect a similar building.

Los Angeles—Decline in heavy construction has yet to be stemmed, and demand for structural shapes continues light. With the exception of one or two items, structurals are in more than ample supply for all current requirements. Principal source of demand now is in small municipal jobs and light, miscellaneous public and private construction.



IT is *wise economy* to buy cutting fluids on a basis of performance rather than on a price basis. This is borne out by the case of a large screw products company in Chicago machining 11/16" round stainless steel types 303 and 440. Operations include forming, drilling and reaming on a New Britain-Gridley automatic screw machine. A number of different cutting oils had been used on this job until one was found that seemed to give relatively satisfactory performance. However, this product was replaced after the first trial with Stuart's Thred-Kut. Not only was there a marked improvement in finish, but *tool life was increased 3 to 4 hours and daily production was increased.*

The above case study is a typical example of how the best cutting fluid for the job will pay its original cost over and over again. D. A. Stuart Oil Company representatives preach the gospel of "Wise Economy." They can help you cut costs with cutting fluids best suited to your requirements. Ask for booklet, *Cutting Fluids for Better Machining.*

STUART *service goes with every barrel*

D.A. Stuart Oil CO.

2735½ S. TROY ST., CHICAGO 23, ILL.

Wire . . .

Wire Prices, Page 153

Pittsburgh—Record wire production of recent months, in combination with easing pressure for deliveries as inventory pipe lines became filled, has forced sellers with premium prices to reduce quotations to competitive levels. Downtrend in demand for manufacturers' wire items has been more pronounced than for merchant items.

Birmingham—Wire products continue as the only steel items which have approximately caught up with demand. Some increase in fencing requirements is noted, and a pickup in demand for nails has been evident over the past week or 10 days.

Tin Plate . . .

Tin Plate Prices, Page 153

Pittsburgh—Sellers report slight increase in order cancellations and deferment of shipments. However, there is little concern as to prospect of capacity operations throughout second quarter, although the third and fourth quarter demand outlook is not as bright as freely predicted earlier this year.

Los Angeles—Columbia's new tin mill at Pittsburg is increasing production steadily, with output going almost entirely to northern California can manufacturers.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Pittsburgh—Sellers report definite easing in demand for concrete new billet reinforcing bars and the same condition to a greater extent exists in the rail steel reinforcing bar industry. New billet reinforcing bar prices continue unchanged but substantial declines are reported in prices for rail steel items. Sharp reduction in scrap prices has made it possible for industry members to drastically reduce prices. West Virginia Steel & Mfg. Co., Huntington, W. Va., lowered rail steel merchant and reinforcing bar prices from $5.35 to $3.35 per 100 pounds, as of Apr. 1. Sweet's Steel Co., Williamsport, Pa., has established a price of $4.65 on reinforcing rail steel bars, off $9 a ton; merchant rail steel bars at $4.75, a decline of $7.

Los Angeles—Although demand for reinforcing bars has been extremely spotty, requirements will be boosted considerably by California's 1949 program of highway construction. Contracts for projects totaling $9 million will be awarded this week, with another $20 million to follow within a month. For the three-year period ending June 30, 1950, the California Division of Highways will have completed or underway projects costing more than $230 million.

Seattle—While demand for merchant bars has decreased, reinforcing bars are in strong position, local mills reporting strong pressure from public works and construction sources, the potential volume of business being at top level. There are many projects involving small tonnages but numerous jobs in the Columbia basin and Alaska involve large quantities of bars.

LOST!

3 BILLION DOLLARS EVERY YEAR

The annual toll taken by the elements that cause rust and corrosion is staggering. How much of this are you *needlessly* paying in costly replacement and maintenance *because you didn't* provide protection for exposed installations and equipment?

Hot-Dip Galvanizing Seals in the Base Metal

When base metal is encased in rust-preventing zinc by the Hot-Dip Galvanizing process the ravages of rust and corrosion can't touch the metal because it is *sealed in.* Rust and corrosive elements are *sealed out.*

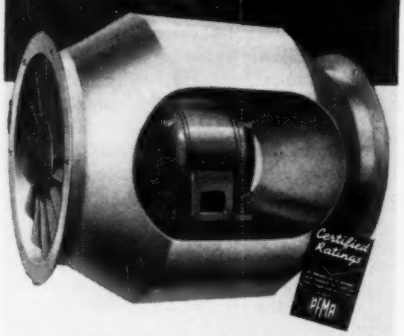
Write for Membership Roster

Every member of this Association has the cumulative experience of the entire membership at his disposal. He has the most modern equipment and a trained organization that are at your service. For membership roster, write The Secretary, American Hot Dip Galvanizers Association, Inc., First National Bank Building, Pittsburgh, Pa.

hot-dip GALVANIZING

If . . .
you have a
dangerous
or
obnoxious
fume or heat
removal
problem . . .

De Bothezat
BIFURCATOR
FANS



Safeguard employee health and comply with state regulations with BIFURCATOR FANS. These direct-driven, axial-flow fans fit right into ducts without special supports or platforms. Motor is open to room air—protected from discharging fumes. Acid-resistant housings available. Certified capacities from 1,090 to 43,200 cu. ft. air per min.

INVESTIGATE *Now!*

SEND FOR *Free* BOOKLETS

DE BOTHEZAT FANS DIVISION, DEPT. T-3
American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

Please send without obligation free booklets, "Lateral Ventilation of Tanks" and "BIFURCATOR Catalog DB-4-48".

Firm_____

Address_____

City and Zone_____ State_____

Sender's Name_____

Scrap . . .

Quotations drop further to basis of $32 to $33, Pittsburgh. Sales light

Scrap Prices, Page 158

Pittsburgh—Scrap quotations declined sharply again last week, based on broker offering prices and on the purchase of a repersentative tonnage of No. 1 industrial scrap by a large consumer at $33. A considerable tonnage of customer industrial scrap is being contracted at published lower levels.

No. 1 heavy melting steel is now priced within the range of $32 to $33, off $3 to $4 from a week ago and about $16 from the postwar peak; low phos scrap, $35 to $36; short shovel turnings, $24 to $25.

Foundries are out of the market with the consequence that cast scrap quotations are largely nominal. Award on Pennsylvania Railroad list is expected early this week at a level substantially below the last sale price. The sharp reduction in scrap quotations has resulted in a considerable revenue loss to metal working companies.

Philadelphia—Scrap prices continue to dip sharply. Trading in the open-hearth grades remains at a virtual standstill and shipments are still being held up in at least a couple of instances. On the other hand, one Eastern Pennsylvania mill, which had been holding up tonnage, began late last week to take in such material as was on order, a light amount of tonnage at best. Except for one mill, there has been virtually no buying of heavy melting steel and in that instance purchases have been small. Most consumers of open-hearth scrap still have fair inventories.

No. 1 heavy melting steel is now holding at $27-$28, delivered, a reduction of $4 a ton; No. 2 heavy melting and No. 1 busheling, $23-$24; No. 1 bundles, $27-$28; and No. 2 bundles $21-$22.

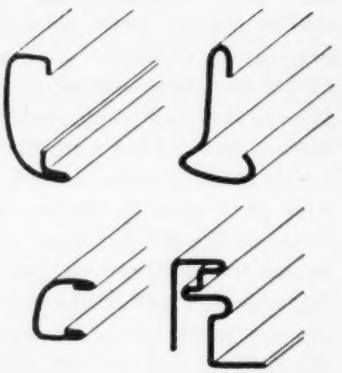
Frankford Arsenal, on open bidding, recently arranged to dispose of its second quarter tonnage of machine shop turnings, estimated at around 450 tons, at $12.57, f.o.b. plant. Meanwhile, the general market on machine shop turnings is nominally $17-$18, delivered, with lower prices shortly being indicated. Mixed borings and turnings are $14-$15 delivered; short shovel turnings, $22-$23.

Low phos scrap has undergone a further heavy decline with bar crop and plate, punchings and plate scrap and cut structurals moving at $31-$32 on small scale buying. Electric furnace bundles are now $28-$29; heavy turnings, $27-$28. Trading in No. 1 chemical borings is at a standstill.

Cast grades continue to weaken, with No. 1 cupola cast off about $6 a ton to $29-$30, delivered; No. 1 machinery cast, $32-$33; charging box cast and heavy breakable, $28; and unstripped motor blocks, $26.50-$27.50. Clean auto cast has been reduced to $30-$31 and No. 1 wheels, $32-$33.

New York—Brokers' buying prices are generally lower on light trading. They are now offering $21-$22 on No. 1 heavy melting steel; $17-$18

ROLLS



DESIGNERS & BUILDERS
of
Metal Forming Rolls for Mouldings & Structural Sections .010" to .062" Aluminum, Brass, Cold Rolled Steel & Stainless Steel

ESTABLISHED 1938

ACME ROLL CO.
2717 E. Larned Street
Detroit 7, Michigan

on No. 2 melting; $17 on No. 1 busheling; $20 on No. 1 bundles; $16-$17 on No. 2 bundles. Machine shop turnings and mixed borings and turnings are $11-$12, f.o.b. shipping point; short shovel turning, $13-$14; punchings and plate scrap and electric furnace bundles, $20-$21.

Brokers are now offering $24-$25 on No. 1 cupola; $25-$26 on No. 1 machinery; $22-$23 on charging box cast and heavy breakable; and $20-$21 on unstripped motor blocks.

Boston—While weakness in heavy melting steel scrap is acute, reaction in minor open-hearth grades is even more drastic, notably in turnings, including short shoveling, and borings. In absence of business, prices are more or less nominal.

Cleveland—Scrap buying by consumers was at a standstill at the close of March and there were indications that at least some mills will continue to remain out of the market on openhearth grades during April.

Lack of buying has forced prices down even further, brokers' offering prices here last week reported at $28.00-28.50 on heavy melting steel.

With jobbing foundry operations still dull, there is little demand for cast grades of scrap and No. 1 cupola cast quotations slipped further last week to $40.00-41.00.

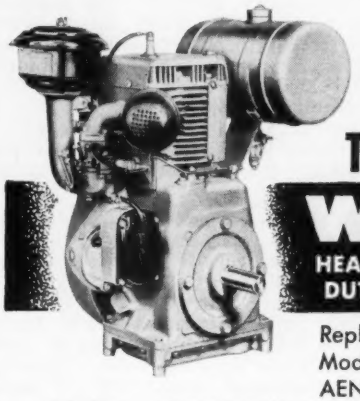
Buffalo—Fresh price breaks, ranging from $1 to $4.50 a ton, rocked the scrap market during the week.

While the market remained stalemated from a new business standpoint, prevailing nominal quotations were recognized as the present market because dealers showed a ready willingness to do business within the ranges. No. 2 heavy melting steel slipped to $26-$27; there were some whisperings that the market may find itself toppling to the old OPA level of $19.25 for No. 2 material. Dealers are guarding themselves against losses on sales by slashing yard prices.

Detroit—With buyers and sellers equally confused over which way to turn, the market locally has paused to catch its breath, although sentiment holds bearish. New auto lists were released for bids last week, and more are expected this week. They include nearly all items except for bundles, some of which appear to be still earmarked for mills. A slight test of the market for cast material has developed, with sale of five cars of clean auto cast. A $2 per ton reduction to $31-$33 is indicated.

Chicago—A buy by a leading district mill in the closing days of March, instead of stabilizing the market at a lower price only lowered the hopes of many in the trade; tonnage was insignificant and as far as observers can tell now is the only ordering to be done by this interest for another month. Specifically the price paid for No. 1 heavy melting steel was $32, for No. 2 heavy melting $30, for No. 2 bundles $27, and for No. 1 railroad heavy melting $34.50, both No. 1 heavy melting prices being considered as applying to allocated scrap, dealer material presently being offered at $2 and $1.50, respectively, under these prices. The cast market is also at a standstill.

Cincinnati — Quotations on most grades of scrap have sagged lower on a market in which the price level



20% Increase in H. P.
15% Decrease in weight
That's the *New* MODEL AEN
WISCONSIN
HEAVY-DUTY *Air-Cooled* ENGINE!

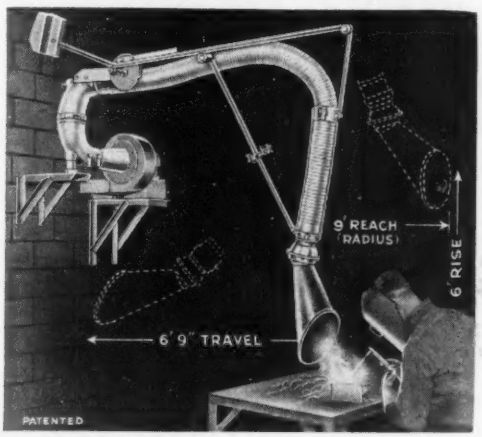
Replacing the universally popular Wisconsin Model AEH Air-Cooled Engine, the new Model AEN turns up 7.5 H.P. at 3,000 R.P.M. as against 6.1 H.P. at 3,200 R.P.M. delivered by the engine it replaces. Weight: 110 lbs., as against 130 lbs. for the AEH.

All this has been accomplished without sacrificing heavy-duty crankshaft capacity or any of the traditional Wisconsin features such as: Tapered roller bearings at *both* ends of the drop-forged crankshaft; oil pump and spray lubrication; weather-sealed high tension outside magneto with impulse coupling for quick starting and dependable ignition in any climate, in any weather; flywheel-fan air-cooling — extremely efficient at all temperatures from sub-zero to 140°F.

The Model AEN represents a major achievement in the design and construction of a light weight heavy-duty power unit for all-purpose power applications. Write for Bulletin S-109.

The Wisconsin line includes 4-cycle single cylinder, 2- and 4-cylinder models in a complete power range from 2 to 30 H.P.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 14, WISCONSIN



RUEMELIN Fume Collector
Removes Welding Fumes at the Source!...

Why continue to let your employees inhale welding fumes? You can solve the problem quickly and efficiently by installing a Ruemelin Fume Collector. It produces a powerful suction that draws out noxious gases, smoke and heat at the source. Guards employee health, resulting in less welder fatigue, therefore, greater plant output. Clears shop air with minimum loss of building heat. Covers maximum welding area vertically, horizontally and by circle swing. Shipped assembled, easy to install. 9 ft. and 15 ft. sizes (radius of swing).

Free engineering service for your fume collector installation. Write for New Bulletin 37-D, just off the press.

RUEMELIN MFG. CO.
3882 N. PALMER STREET MILWAUKEE 12, WIS., U. S. A.
MANUFACTURERS AND ENGINEERS — SAND BLAST AND DUST COLLECTING EQUIPMENT — WELDING FUME COLLECTORS

A 5258-¼R2

is not clearly defined. The market has turned dull while all melters show intent to cut scrap inventories. Buying interest in the foundry grades is off sharply. Lack of outlets for malleable brought a $4 cut, to $31.

Dallas—Activity in scrap continues slow, with brokers and dealers reporting too few sales to quote a market.

St. Louis—Weakness in offering prices of railroad grades, which heretofore have held up better than other scrap items, was the highlight of the market here last week. Rerolling rail quotations ranged from $38 to $40, as compared to a general $43 the previous week. Reason is that around 40,000 tons of rails from short-line abandonments in Texas and Colorado hit the market at a time when mills were well supplied and offerings were already heavy.

Cast iron grades have drifted down about $1 and turnings and borings from $2 to $3. Turnings market in St. Louis is practically a thing of the past. Scrap shipments continue only fair, not quite up to mills' daily melt. Mill and foundry reserves are around 60 days and no new buying is expected until old orders expire Apr. 15-20.

Los Angeles—Scrap continues to move slowly, with demand light and the price undertone soft.

Kaiser's Fontana, Calif., plant has received melting steel from the Philippines and other Pacific battle areas, with the most recent shipment coming from Japan, a 9000-ton cargo of naval guns and armor plate.

San Francisco — Mill buying continues selective and, although prices remain unchanged, the undertone is soft.

Seattle — Mills report receipts of steel scrap are increasing and the situation is quite satisfactory. Inventories are rising. The market is steady at $25 per gross ton, fob mill, for heavy melting. Cast iron scrap is also in good supply.

Export Price List Revised

New York—Reflecting reduction in price of zinc, United States Steel export Co., U. S. Steel subsidiary, has announced the following new export prices, effective as of Mar. 24, on carlots with freight included to New York, Philadelphia or Baltimore.

American Standard Pipe, T. & C., Galvanized:	Per Cent off List
Butt Weld, 2½ and 3 in.	21.6
Seamless, 3½ to 6 in.	14.1
English Gas Tubes, T. & C., Galvanized:	
Buttweld, 2½ and 3 in.	23.5

Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

Steel Sought for Subway

Washington—Bids have been tendered for 8000 tons of steel for the new Toronto subway, it is reported from Canada through American official channels. U. S. contractors have been invited to bid also on actual construction of the project.

Pig Iron . . .

Pig Iron Prices, Page 154

Dallas—Lone Star Steel Co., reduced its prices $4 a ton, effective as of Mar. 28, to the basis of $46 per ton for standard basic grade and $46.50 for No. 2 foundry, low phosphorous southern grade. These prices are f.o.b. at plant, Lone Star, Tex. The delivered prices, exclusive of the federal transportation tax, are $50.50 per gross ton for basic and $51 for No. 2 foundry, f.a.s. Gulf ports.

Provo, Utah — Kaiser & Frazer Parts Corp., this city, reduced prices $8 a ton, effective as of Mar. 22, to the basis of $47 for basic and $47.50 for No. 2 foundry pig iron.

Boston—For second quarter, Mystic iron price is 25 cents per ton lower; $52.50 Everett furnace for No. 2 foundry and $53.00 malleable. This price is established on costs during December through February. Minor shifts result as to delivered prices compared with Buffalo, but equalization remains between Worcester and Springfield. Foundry melt continues at low level, although current consumption of castings is estimated above production since consumers are drawing on inventories. Inventories of iron are heavy in some instances with considerable foreign tonnage, which arrived after the emergency eased, included. More outside iron is offered, including Buffalo tonnage, but buying is confined to smaller shops and others who did not build up stocks to any extent late last year.

New York—District foundries are specifying pig iron less actively. With few exceptions operations are no lower than they were two or three weeks ago, but foundry inventories had been built up to a point where there is less buying for that reason. In general, castings production may be a shade better than it was recently, but it is not sufficiently better to offset lack of interest in pig iron because of the improved inventory position of the foundries. Moreover, consumers are moving cautiously because of the possibility of lower pig iron prices.

Philadelphia—Pig iron demand has slumped further with consumers, particularly the larger foundries, curtailing specifications. In some instances, they are out of the market entirely, so as to have stocks at a minimum in the event of a general price reduction in pig iron. There is a growing belief in foundry circles that iron prices are going to settle to lower levels, possibly not in the immediate future, but before too much time has elapsed. Continued heavy decline in scrap prices is regarded as a weakening factor, leading eventually to greater consumption of scrap at the expense of iron. Moreover, cheaper scrap is reducing the cost of making pig iron.

Pittsburgh—Sellers of merchant iron believe extent of anticipated increase in demand this spring for enamelware will largely determine whether recent sharp reduction in foundry activity here is a temporary adjustment or the beginning of a more serious recession in general business activity. Captive foundries serving consumer goods industries lately have experienced substantial

reduction in order backlogs, reflecting reduction in operations at Mansfield plant of Westinghouse Electric, for example. However, leading seller of merchant iron has not yet experienced any difficulty in distributing its furnace output. Return to near normal price relationship between prices for cast scrap and pig iron has prompted most foundries to increase proportion of pig iron in their melting operations.

Cleveland — Demand for foundry iron has dropped to the extent that one producer of merchant tonnage is not fully booked for its April production and is not certain it will be. Until now this producer has had more orders than it could fill. Whether this producer will continue its present rate of merchant iron output and stockpile any unsold tonnage has not been determined, the company being inclined to meet the new and changed conditions from day to day.

Cincinnati—Further easing in the pig iron supply is being attributed to desire by most foundries to avoid supplementing inventories. So far, furnace interests have been able to place district allocations of both northern and southern iron even though melters' cutbacks and cancellation have been frequent.

Birmingham—Pig iron supplies are still running behind the ordinary needs of the district. Merchant iron melters are not too optimistic as to how long that condition will last, but they are hard put currently to keep the trade satisfied. Foundry interests seem to have struck a fairly satisfactory level of production after a pronounced leveling off.

St. Louis — Effective with April shipments, Koppers' Granite City plant has abandoned pig iron allocations for the first time since the war. Officials say their customers can now have all the pig they want "within reason." Back of the abandonment is the continuing softening of demand and a 150-ton improvement in daily production as a result of better coking coal quality. Except for a three-week period, the two furnaces here have held consistently to a 1150-ton daily rate. Pig iron demand is increasingly spotty. Some jobbing foundries have cut back to two to four days a week, while others are going strong. For example, stove manufacturers continue to reduce requirements and weakness is showing up in steel and iron foundries serving the oil refining trades in the southwest. But those serving the auto and farm equipment industries are increasing operations. Trade rumors are that Chevrolet has upped its parts demand here 25 per cent, which doesn't take account of a recently announced plan to double local Chevrolet output. Weakening pig iron demand is not regarded as permanent, however, because much is due to inventory confusion. Many foundries which fought hard to accumulate stocks are trying just as hard now to unload them due to the market uncertainty. Many of their castings customers are doing likewise. Predictions that the upcoming $1 rise in ore prices may boost pig iron $2, however, may reverse the inventory sentiment if declining coal prices do not offset the rise.

Wyandotte
makes the
complete line of

BALANCED METAL CLEANERS

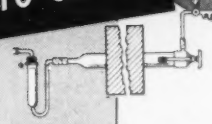
- Cleaners for any soak, electrolytic, spray or tumble operation.
- Degreasing compounds and specialty products including burnishing compounds, paint strippers and burring compounds.
- Wyandotte Zorball, the all-purpose floor absorbent, for reducing fire and slipping hazards.
- For complete information, just call your nearest Wyandotte Representative. He's always at your service.

WYANDOTTE CHEMICALS CORPORATION • Wyandotte, Michigan
SERVICE REPRESENTATIVES IN 88 CITIES

Wyandotte
REG. U. S. PAT. OFF.

Giving Outstanding Service in Metallurgical Laboratories FROM COAST TO COAST

McDANEL HIGH TEMPERATURE COMBUSTION TUBES



OTHER McDANEL PRODUCTS

- Non-Spalling, non-blistering, gas tight Combustion Tubes.
- High Temperature Zirco Tubes.
- Self Cooling Combustion Tubes.
- Refractory Porcelain Specialties in stock or made to your specifications for your individual needs.

The acid test for any product is how it stands up in service. Here is what leading metallurgists in the iron and steel industries say about McDanel Porcelain Combustion Tubes and Zirco Tubes: "Highly satisfactory in every respect"—"Never spall or blister"—"We run 8 to 10,000 carbon and sulphur analyses a month with seldom a failure".

McDanel Refractory Porcelain Co.
Beaver Falls . . . Penna.

Warehouse . . .

Warehouse Prices, Page 155

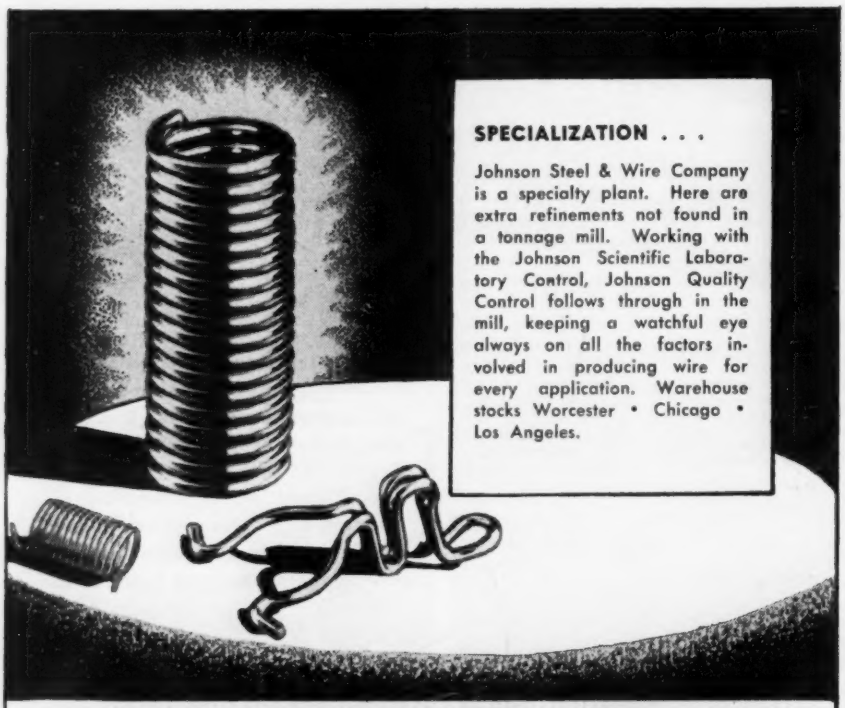
Pittsburgh—Warehouse steel price quotations are relatively uniform for the first time in months. Levinson Steel Co., March 28, reduced basic prices on its steel products as follows: Hot-rolled sheets off 5 cents to $4.85 per 100 pounds; hot-rolled strip off 10 cents to $5; hot-rolled bars off 20 cents to $4.90; and carbon plates off 20 cents to $5.05. Joseph T. Ryerson & Son, Inc. also reduced hot-rolled strip to the $5 per 100 pounds competitive level, off 10 cents; hot-rolled bars were reduced 10 cents to $4.90; structural shapes, 15 cents to $4.90; and plates, 10 cents to $5.10. Ryerson's plate price is still 5 cents above competition. Steel distributors' inventory position has recorded little change in recent weeks, although pressure for deliveries definitely has eased. Some interests expect to be able to obtain greater mill steel tonnage over the coming months.

Cleveland — Reflecting increased cost - consciousness of consumers, warehouses are increasingly on the alert to keep their prices low enough to remain competitive. One seller of structural shapes has lowered its price to that of another leading warehouse. One distributor, whose prices have been above those of most other warehouses, revealed it has its price structure under study and that some changes may be forthcoming. As a result of the price decrease in zinc, warehouses are reducing their prices on galvanized sheets.

Chicago—Price reduction on galvanized sheets reflecting lower zinc price was put into effect by several distributors at the beginning of last week, new country price for 10 gage being $7.05 per 100 pounds. New order inquiry is definitely lower in all specifications at the warehouse level, opinion being that some consumer pressure has been transferred from distributors to mills in effort to pare materials costs. Inventories are still out of balance, ex-quota tonnage occasionally being offered by mills to distributors generally not being in the wanted products. Business slow-down is most noticeable among warehouses handling secondary products and stocks of some of these items are becoming burdensome. One interest reports an almost complete absence of orders for the lightest gage tin mill products, and demand for galvanized sheets for use in pail-making has dropped substantially. Pricewise the secondary market is confused, and some mills report sale of this material is increasingly difficult with result more is being scrapped. While many distributors adhere to prices directly related to mill prices for primes, others negotiate their prices or charge a full warehouse price. Latter practice, some say, is necessary because mills bill material as primes. Reluctance of customers to accept off-grades, however, is causing distributors to be more critical of mill offerings.

Dallas—Steel supplies are loosening up generally at warehouses in this area, though sheets (particularly roofing material) plates and small pipe continue tight. Buying is on a hand-to-mouth basis, which warehousemen attribute primarily to fears of further price declines. This cautious buying applies even to items in the critical categories.

San Francisco—Jobbers welcomed the price reduction on products made by the Kaiser mill at Fontana, as they have been dependent on several Fontana items not easily obtainable elsewhere. Meantime, demand continues little changed in this area with small users buying spottily and cautiously. Supplies of nearly all materials continue to increase and inventories generally are well-balanced, with some surpluses being reported in wire items, stainless tubing, etc.



SPECIALIZATION . . .

Johnson Steel & Wire Company is a specialty plant. Here are extra refinements not found in a tonnage mill. Working with the Johnson Scientific Laboratory Control, Johnson Quality Control follows through in the mill, keeping a watchful eye always on all the factors involved in producing wire for every application. Warehouse stocks Worcester • Chicago • Los Angeles.

JOHNSON

STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

NEW YORK PHILADELPHIA CLEVELAND DETROIT AKRON CHICAGO
ATLANTA HOUSTON TULSA LOS ANGELES TORONTO

Rails, Cars . . .

Track Material Prices, Page 153

Pittsburgh—Sweet's Steel Co., Williamsport, Pa., has reduced its rail-steel light-rail price $12 per ton from $5.10 to $4.50 per 100 pounds. West Virginia Steel & Mfg. Co. established a price Apr. 1 of $3.55 per 100 pounds for rail-steel light rails, base, Huntington, W. Va. Company's lower prices are offset somewhat by higher extras.

Washington—Col. J. Monroe Johnson, director, Office of Defense Transportation, last week disclosed his office plans to suggest to federal officials the government build 550,000 new freight cars at a cost of $2,500,000,000. He will suggest these cars be leased to the railroads if there is use for them, and that unused cars be stockpiled for a military emergency.

Colonel Johnson made known his views in connection with his announcement that the ODT is pulling out of the voluntary freight car building program as of Apr. 15. The ODT is due to liquidate by June 30.

At present there is more steel for freight cars than there are orders in the hands of carbuilders, Colonel Johnson said.

He said the nation is planning to spend $18 billion annually on a rearmament program with no plan for reinforcing the freight car supply, and disclosed he has urged the government to buy up discarded steam locomotives at scrap prices in order to stockpile them for an emergency.

Colonel Johnson estimated the proposed freight car building program would cost about $4500 a car at present prices but that the cost could be trimmed if orders were placed in large volume.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

375 tons, boiler house, state hospital, Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

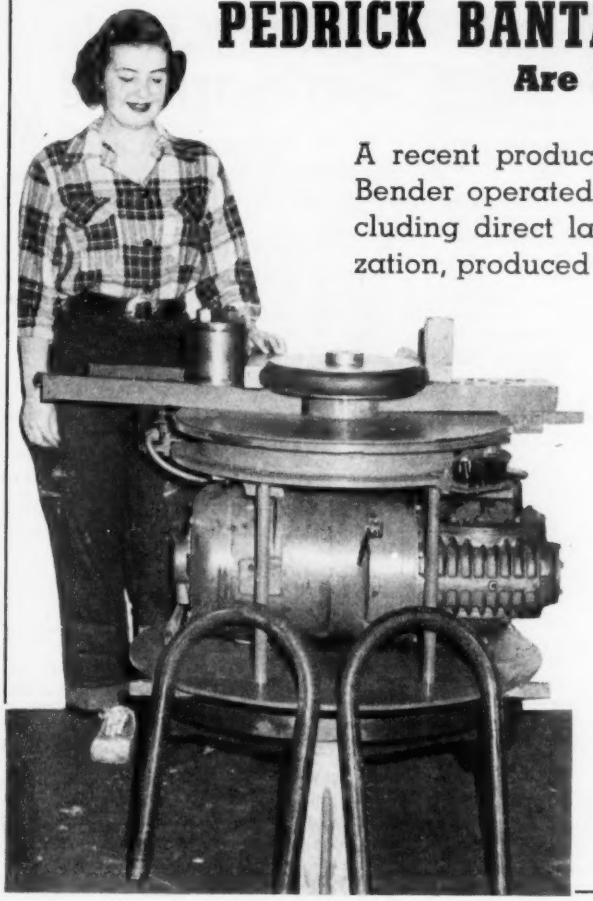
300 tons, Harleysville Insurance Co., Harleysville, Pa., to Bethlehem Fabricators Inc., Bethlehem, Pa.

280 tons, Pennsylvania Railroad bridge, Newark, O., to Bethlehem Steel Co., Bethlehem, Pa.

100 tons or more, Coulee dam switchyard, to

PEDRICK BANTAM PRODUCTION BENDERS

Are Low Cost Machines



A recent production run on a Pedrick Bantam Production Bender operated by a girl at the going labor rates and including direct labor, plant overhead and machine amortization, produced return bends for a radiant heating contract on 1¼" standard pipe at an amazingly low cost. This is so because the first cost of the machine is very low for so productive a unit. Other materials can also be bent and when the units are small enough to be handled conveniently in multiple, the cost is lower still.

Write for
Descriptive literature

PEDRICK TOOL AND MACHINE COMPANY
3640 North Lawrence Street,
Philadelphia 40, Pa.

FORGINGS

HAMMERED STEEL FORGINGS

up to 6000 lbs. each

ALL TYPES

Smooth Forged Finished — Rough Turned Hollow Bored

and Heat Treated to Specifications
CRANKSHAFTS, CONNECTING RODS, SHAFTING
Roll—Gear Blanks—Pinions and Miscellaneous Forgings

BAY CITY FORGE CO.
ERIE, PA.
Over a Quarter of a Century of Dependable Service and Quality Products

Versatility counts in
HOT DIP GALVANIZING

any size or shape product, any size
order from the smallest to the largest

Excellent facilities for export shipment

ENTERPRISE
GALVANIZING COMPANY
2525 E Cumberland Street Philadelphia 25, Pa.

Precision ROD CUTTING at High Speed

with the New
DI-ACRO ROD PARTER

The DI-ACRO Rod Parter further increases the applications of "DIE-LESS DUPLICATING" as a cost-cutting, time-saving production technique so well established by DI-ACRO Precision Benders, Brakes and Shears.

Do you require precision?—The DI-ACRO Rod Parter holds tolerance to .001" on duplicated cuts. The ends are square, and roundness is maintained.

Do you want speed?—The Rod Parter exceeds output of other methods with equal accuracy, on rods and bars up to ⅝". Torrington Roller Bearings incorporated in an exclusive multiple leverage arrangement provide remarkable ease of operation in both heavy and light materials.

"PARTS OFF" MANY MATERIALS
All hot and cold rolled rods • Stainless steel • Chrome Molybdenum • Aluminum Brass • Copper • Bi-Metals • Many types of plastics • Fibre • Rubber • Wood

"DIE-LESS DUPLICATING" CATALOG!
Shows parts produced without die expense by DI-ACRO Benders, Brakes, Shears, Rod Parters, Notchers, Punches. Send for your free copy.

Pronounced "DIE-ACK-RO"

DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING

O'NEIL-IRWIN MFG. CO.
304 EIGHTH AVENUE • LAKE CITY, MINNESOTA

Union Steel Co., Los Angeles, low $17,043; also other small awards, same project.

STRUCTURAL STEEL PENDING

5200 tons, Jackson pier, No. 80, south, Philadelphia; bids Apr. 18.

1600 tons, state hospital, Binghamton, N. Y.; bids asked.

850 tons, 1022-foot Yellowstone river, Montana state bridge; general contract to W. P. Roscoe Co., Billings, low $623,848.

800 tons, Public School No. 33, Manhattan, New York; bids asked.

800 tons, two transit sheds, Newark, N. J., for the New York Port Authority; bids asked.

350 tons, approximately, addition, Public School No. 92, Brooklyn, N. Y.; bids Apr. 4.

345 tons, including 70 tons reinforcing, Turnagain Arm road project, Alaska; bids to Public Roads Commission, Juneau, Alaska, Apr. 18.

300 tons, Benade Hall, academy of new church, Bryn Athyn, Pa.; bids Apr. 5.

Unstated, warm storage motor pool building, Fort Richardson, Alaska; general contract by U. S. Engineers to Patti-McDonald Construction Co., Kansas City, low $270,490.

Unstated, steel and aluminum structurals for Grand Coulee pump plant; bids to Bureau of Reclamation, Denver, Apr. 12.

REINFORCING BARS . . .

REINFORCING BARS PLACED

200 tons, miscellaneous construction projects, including 50 tons for courthouse at Waterville, Wash., to Northwest Steel Rolling Mills Inc., Seattle.

150 tons, Long Lake Washington state highway bridge, to Northwest Steel Rolling Mills Inc., Seattle; Henry Hagman, Cashmere, general contract.

100 tons, grain elevator, Connell, Wash., to Northwest Steel Rolling Mills Inc., Seattle.

REINFORCING BARS PENDING

5000 tons, north dam, Columbia basin; bids to Bureau of Reclamation, Denver, early April.

200 tons, Oregon state highway projects, Douglas and Lane counties; bids to commission, Portland, Oreg., Apr. 11.

150 tons, Montana state highway spans; general contracts to Walter Mackin & Sons, Billings, $108,023 bridge in Wheatland county; Utility Builders Inc., Great Falls, $63,598, for span in Cascade county.

Unstated, 17-mile unit West canal, Columbia basin project; general contracts to Morrison-Knudsen Co., $6,136,234 and Mathews Bros., Idaho Falls, Ida., $174,330; materials to be furnished by Bureau of Reclamation.

PLATES . . .

PLATES PLACED

100 tons or more, penstocks, Philpott dam, U. S. Engineer, Norfolk, Va., to Gary Steel Products Corp., Norfolk.

PLATES PENDING

185 tons, navy, eastern yards and Oakland, Calif., inv. 681; bids Apr. 7.

PIPE . . .

CAST IRON PIPE PENDING

1000 tons, 12-inch cast iron pipe, for local improvements; bids to Tacoma, Wash., Apr. 8.

500 tons, 12 to 4 inch cast iron water mains; bids in to Chewelah, Wash.

RAILS, CARS . . .

LOCOMOTIVES PLACED

International Railroad, nine 1000-horsepower diesel-electric locomotives, switcher type, to American Locomotive Co., New York.

New Efficiency and Savings in Your Yard with

ROUSTABOUT CRANES

The fast tractor-footed load hustlers

● Wide open yard spaces that eat up profits start paying off with Roustabout Cranes on the job, loading, unloading, moving, shifting, stacking. Grab-bucket, hook or magnet, *where* you want them, *when* you want them. Engineered for years of overwork—mounted on wheel or crawler tractors. Loads to 7½ tons. Roustabout saves costly delays and manpower . . . pays for itself fast. Write for the money-saving facts today—to Dept. H-3.

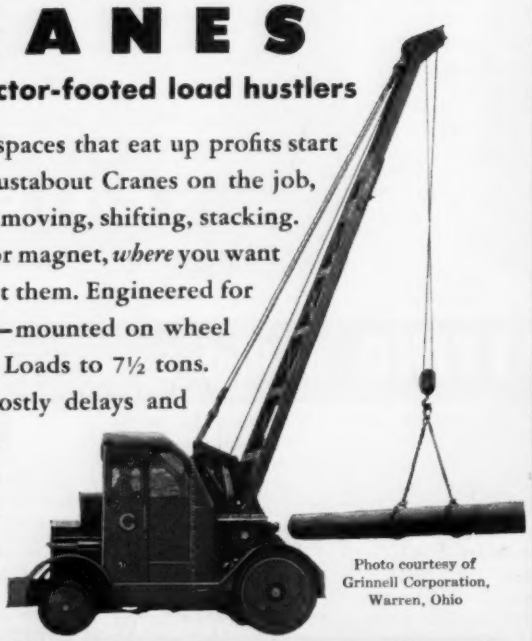


Photo courtesy of Grinnell Corporation, Warren, Ohio

HUGHES-KEENAN CORPORATION

DELAWARE, OHIO, U. S. A.

Load-Handling Specialists since 1904

CONSTRUCTION AND ENTERPRISE

CONNECTICUT

HARTFORD, CONN.—Sun Oil Co., 835 Statler Bldg., Boston, will build a $68,000 oil terminal.

NEW YORK

HUNTINGTON, N. Y.—Telephonics Corp., 350 W. 31st St., New York, has awarded a $207,000 contract to Brown & Matthews Inc., 122 E. 42nd St., New York, for construction of a plant.

OHIO

AKRON—B. F. Goodrich Co., 500 S. Main St., will build a $250,000 belt plant; Austin Co., 16112 Euclid Ave., Cleveland, engineer.

BUCYRUS, O.—New York Central Railroad plans a $300,000 improvement program, using Bucyrus as headquarters for the servicing and repairing of about 50 diesel locomotives.

CLEVELAND—Mechanical Rubber & Brass Products Co., 4043 St. Clair Ave., has been incorporated to facilitate a refinancing and reorganization program which will expand the firm's business.

CLEVELAND—Swiss Metal Finishers Inc. has been incorporated to do all types of metal finishing. The firm will occupy a plant at 1794 E. 55th St. Incorporators are Morton I. Selman, Charles R. Miller, and Rhea Gross.

PENNSYLVANIA

ALTOONA, PA.—Altoona Enterprises Inc., c/o Chamber of Commerce, Commerce Bldg., will build a $200,000 manufacturing building; plans by Hunter, Caldwell & Campbell, 3601 Fifth Ave.

BRACKENRIDGE, PA. — Alleghany Ludlum Steel Corp., Oliver Bldg., Pittsburgh, plans a $150,000 blooming mill.

BRISTOL, PA. — Kaiser - Fleetwings Inc. plans a $2,160,000 porcelain enameling plant, and a $2 million main factory building addition for manufacturing bathroom and kitchen fixtures.

LANCASTER, PA.—Armstrong Cork Co. will build a $3,500,000 research laboratory, Liberty and Mary Sts.; plans by Shreve, Lamb & Harmon Associates, 11 E. 44th St., New York.

NEVILLE ISLAND, PA. — Chaplin Fulton Mfg. Co., 38 Penn Ave., Pittsburgh, has awarded a $229,187 contract to Rose & Fisher, Republic Bldg., 200 E. Ohio St., Pittsburgh, for construction of a manufacturing building.

PHILADELPHIA — Socony Vacuum Oil Co. Inc. plans an $18 million refinery, 58th St. & Schuylkill river.

PHILADELPHIA—Pennsylvania Railroad denies the recently circulated report that it plans a $1 million grain elevator at Girard Point. The railroad already has a modern elevator at that location.

TEXAS

BEAUMONT, TEX.—Bethlehem Steel Corp., c/o R. F. Hoffeld, purchasing agent, Island Park, Beaumont, has awarded a $320,000 contract for construction of a substation to Austin Bridge Co., 4720 Sycamore St., Houston.

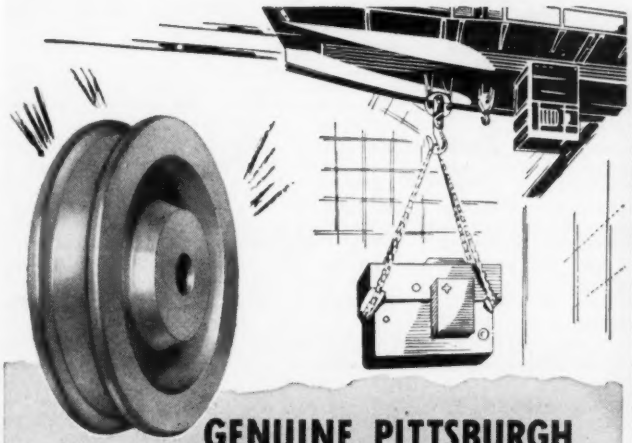
BORGER, TEX.—Phillips Petroleum Co. will build a $100,000 refinery unit; own forces.

DALLAS—Marsh Steel Corp. will build a $70,000 warehouse, 4020 Hancock St.; purchase and hire.

HOUSTON, TEX.—Oceanic Foods, c/o C. W. Edwards, 1009 Jackson St., will build a $600,000 cannery.

STINNETT, TEX.—Stacey-Dresser Engineering Division, (Dresser Interests), 1900 Superior Ave., Cleveland, will build a $500,000 plant.

WICHITA FALLS, TEX.—Panhandle Producing & Refining Co., Panhandle Bldg., will



GENUINE PITTSBURGH ARMORED CRANE WHEELS

Extra Hardness for Longer Life

Yes, this Line of Pittsburgh ARMORED CRANE WHEELS is your answer for a stronger, shock resisting wheel. Treads and flanges Armored to 601-712 BHN. for extra hardness and longer life. Prompt deliveries.

WRITE FOR QUOTATIONS

ARMORED CRANE WHEELS Reg U S Pat Off

Distributors' Inquiries Invited

PITTSBURGH GEAR COMPANY | 27th & Smallman Streets PITTSBURGH 22, PA.

QUALITY GEARS FOR OVER 30 YEARS

THE BELMONT IRON WORKS

STRUCTURAL STEEL—BUILDINGS & BRIDGES

RIVETED—ARC WELDED *Cable Address—Beliron*

Engineers—Fabricators—Erectors—Contractors—Exporters

Shops—Philadelphia—Eddystone—Royersford

Main Office: Phila. 46, Pa.

New York Office—44 Whitehall St., N. Y. 4, N. Y.

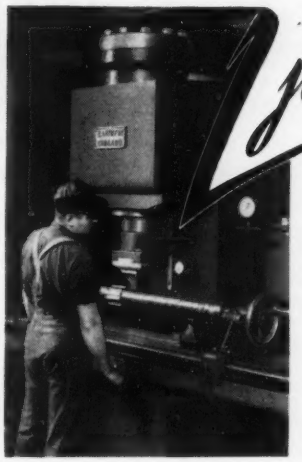
COWLES

GANG SLITTING KNIVES

Standard for Service and Durability. Ground to extremely close Tolerances and Finish. Made by Toolmakers.

COWLES TOOL COMPANY

2086 W. 110th ST. CLEVELAND 2, OHIO



job tested!

One of the big advantages of standard Hannifin Hydraulic Presses is modern "JOB TESTED" design. Hannifin gives you everything you want for fast, accurate production: ram speed and stroke to meet work requirements . . . tables and fixtures arranged for top efficiency . . . controls to suit your needs. For detailed recommendations, see your Hannifin representative or write.

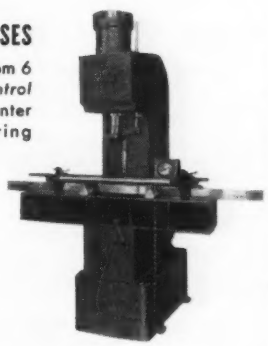
HANNIFIN

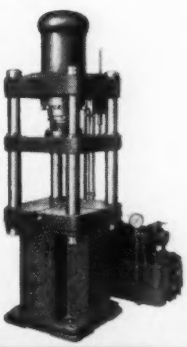
SERIES F FORCING PRESSES

10 standard models. Capacities from 6 to 150 tons. *Sensitive Pressure Control* standard equipment. Built-in power unit. Stroke adjustable. All-steel welded frame; normalized.

SERIES S STRAIGHTENING PRESSES

17 standard models. Capacities from 6 to 150 tons. *Sensitive Pressure Control* standard equipment. Choice of center type or roller vee fixtures; spring mounted.





SERIES C COLUMN TYPE PRESSES

48 standard models. Capacities from 6 to 150 tons. Any bed size. 2 or 4 columns. Manual, automatic or semi-automatic control. Furnished with or without platen.

Ask for a Copy of this NEW CATALOG!

Out of this 20 page catalog on *standardized* Hannifin Hydraulic Presses, it is easy to select the press you need for forcing, straightening, forming, assembling, broaching, and similar operations. Contains detailed information on design and construction and useful engineering data. Ask for free copy of Bulletin No. 130-T.

HANNIFIN CORPORATION

1101 So. Kilbourn Ave., Chicago 24, Ill.

AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES

build a $1 million refinery plant under supervision of Universal Oil Products Co., 310 S. Michigan St., Chicago, and Jones & Laughlin Supply Co., Oil & Gas Bldg., Houston, engineers.

WASHINGTON

KENNEWICK, WASH.—Welch Grape Juice Co., Westfield, N. Y., will build a $1 million plant.

WEST VIRGINIA

CLARKSBURG, W. VA.—Hope Natural Gas Co., 445 Main St., has awarded a $1½ million contract to Gilmore Carmichael, & Olson Co., 1873 E. 55th St., Cleveland, for construction of a warehouse.

WISCONSIN

MILWAUKEE—Cutler-Hammer Co. will build a tool making heat treating building, 315 N. 12th St.; Eschweiler & Eschweiler, 720 E. Mason St., architect.

WAUSAU, WIS.—Western Condensing Co. has purchased a 4½-acre site and buildings of the former Wausau Canning Co. on the west bank of the Wisconsin river, between Knox St. and W. Union Ave., where it plans to build a plant this year.

CANADA

DEEP BAY, B. C.—British Columbia Cement Co. Ltd. will build a $500,000 plant.

NANAIMO, B. C.—H. R. MacMillan Export Co. Ltd., 837 W. Hastings St., Vancouver, will build a $3,750,000 plant.

QUESNEL, B. C.—Bowater Ltd., St. Johns, Newfoundland, and London, England, will build a $1 million pulp plant.

VANCOUVER, B. C. — Monsanto (Canada) Ltd., 1701 W. Broadway, has awarded a $190,000 contract to Northern Construction Co. & J. W. Stewart Ltd., 736 Granville St., for construction of a plant; Pearson & Phillips, 1701 W. Broadway, engineer.

WOODSTOCK, N. B.—Kayrand Mining & Development Co. Ltd. will build a $100,000 lead drilling and zinc properties; owner builds.

HAMILTON, ONT.—Canadian Westinghouse Co. Ltd., Sturgeon Falls, has awarded a $1.3 million contract to Pigott Construction Co. Ltd., Pigott Bldg., for construction of a warehouse.

LONDON, ONT.—General Steel Wares, 199 River St., Toronto, will build a $500,000 foundry.

TORONTO, ONT.—Lever Bros. Ltd., 229 Eastern Ave., will build a $1 million factory south of Keating St.

TORONTO, ONT.—Empire Brass Mfg. Co. Ltd., Dundas St. E., London, Ont., has awarded a $240,000 contract to Pigott Construction Co. Ltd., 1250 Bay St., for construction of a warehouse.

MONTREAL, QUE.—Do So Iron & Metal Co. Ltd., 5814 W. Sherbrooke St., will build a $150,000 plant.

MONTREAL, QUE. — Dominion Textiles Co. Ltd., 710 Victoria Square, has awarded a $1½ million contract to Pentagon Construction Co. Ltd., 1225 Bishop St., for construction of a plant.

MONTREAL, QUE.—Shell Oil Co. Ltd., 660 St. Catherine St. W., has awarded a $1 million contract to A. G. McKee & Co., 2300 Chester Ave., Cleveland, and Fluor Corp. of Canada Ltd., for construction of a refinery.

ST. JOHNS, QUE.—Les Usines Textiles Al-Kahira, c/o J. M. Besso, 150 Broadway, New York, will build a $2 million plant, Mackenzie King St.

GREAT SLAVE LAKE, NORTH WEST TERRITORIES — Consolidated Astoria Mines Ltd. has awarded a $60,000 contract to James McAvoy, c/o owner, for diamond drilling, Indian Mountain Lake area.

PRICES OF LEADING FERROALLOY PRODUCTS

(*Continued from Page 155*)

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90c; ton lots 21.00c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices. **90-95% Ferrosilicon:** Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Odd 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.). C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.90c per lb of alloy, ton lots packed 10.3c, 200 to 1999 lb 10.65c, smaller lots 11.15c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3⅜ lb each and containing exactly 2 lb of Cr.). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3⅛ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c, freight allowed.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W. or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W., $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, Spot, add 5c.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60% Mn 5% max., Si 8% max. C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr. 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Sileaz Alloy: (Si 35-40%, Ca 9-12%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ¼" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.